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PHYSICAL COMPLAINTS WITHOUT ORGANIC BASIS

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WHILE making a study of nonreaders* with normal intelligence and their maladjustments, the writer was struck by the neat demonstration of the development of physical complaints without organic basis as a childish, unconscious attempt by the child to solve a problem beyond his powers. This prompted the further study of 100 clinic and private cases, including twenty-one nonreading cases, with the same entering complaints.

Briefly, the nonreading problem (involving from 10 to 40 per cent of each class) developed after the spread across the country of a popular, quick method of teaching reading by visual memory only—the so-called "look-say" method. As medical men keenly realize, normal variability, whether anatomic, physiologic, or otherwise, prevents an assumption that one method of treatment alone will be successful in an unselected group of from twenty to forty patients. Every case has to be studied individually, and a number of methods with modifications and variations must be available for application as needed.

Educators, having ignored the need of the above percentage of each class for auditory, kinesthetic, or varying combinations of methods in order to store and correlate memory images of reading symbols, are now confronted with a school system whose channels of instructions are clogged throughout with thousands of these reading failures, many of them of good or superior intelligence, all promoted year by year whether they know anything or not, as is the modern practice to prevent inferiority feelings from arising. Half the teachers were reported by the children as becoming impatient or "cross"

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*The term "nonreaders" is used in this paper to denote children who have been unable to learn to read by the second to tenth year of reading instruction.

with these failures in the one hundred cases studied; one-third made cutting comparisons, and 27 per cent called them lazy, stupid, or "dumb." Classmates ridiculed, scorned, and jeered at them, causing a fourfold increase over controls in social maladjustments. Unable to participate year after year in anything calling for reading ability, the children who failed misbehaved more and more on the one hand or retreated within themselves on the other, sitting inert, with vacant looks. As the situation continued over years, these unhappy, intelligent children lost self-confidence, initiative, interest, and cooperation, and they were unable to pay attention, concentrate, or even use their native mentalities as shown by the lowering of their intelligence quotients on an average of 16 points in the twenty-two children retested. In the home, where reading failure has been considered the mark of mental deficiency in the past, the reactions of parents ranged through worry, disapproval, irritation, nagging pressure, anger, disgust, scorn, reproach, acid comparisons, deprivation of privileges, and physical punishment. The higher the social position of the parent, the more pitiless the persecution. Thus, the security in school, social relations, and home to which these children were entitled was lowered for them through no fault of their own, and incalculable damage was done to their developing personalities.

With this background, one can understand the intolerable situation faced by these children who failed reading, from which there was little chance of escape in the three worlds in which a child lives—the home, the social, and the school worlds. A chance stomach-ache gives a welcome respite; a second and a third seem still better, and it is not long before the obliging subconscious mind, after a particularly galling day, sets off an equally obliging nervous system. At the thought of returning to the humiliation next morning, a stomach-ache with real pains is right at hand, made to order even with the trimmings of pallor, nausea, and vomiting if needed. "Can't see well," "Words hop off the page," eye pains, headaches, dizziness, stomach-aches, and pains in the legs were managed by another child in whom the subconscious was working through a responsive body. "Eyes blur," "I get hot and shaky," "Heart feels funny," "Can't breathe," "Very tired" was the record of another. Still another told that pains in a hurt knee recurred, extended to the other knee, and then up to the shoulder and into the hip, which would not allow walking. A fourth said: "Heart beats too fast," "Can't get my breath," "Feel very weak," "Can't eat," "Have a gone feeling," "Think I'm going to faint." The simple type of reaction was common throughout the non-reading series. That it did not progress and did not become a chronic condition with all depended upon the degree of emotional instability and the responsiveness of the total organism, as well as the attitude of the parents, four-fifths of whom became suspicious and unsym-

pathetic, even "hard-boiled." Two illustrative cases, 10 and 13, are appended to give a picture of the effects of reading failure upon children of opposite temperaments.

The following study of physical complaints without organic basis included twenty-one nonreading children and seventy-nine child guidance patients, seventy-three of whom were private or clinic patients of the writer.

Sex Distribution.—There were fifty-four boys and forty-six girls in this series, a distribution which is about the same as that of the general Stanford Children's Clinic, as found in two samples of 500 each.

Age Distribution.—Ages ranged from 4 to 20 years. Age distribution is shown in Table I, with the ages grouped for easier handling and compared with similar age groupings in the child guidance clinic as a whole. In short, the shift shows a steady increase in the proportion of physical complaints without organic basis with the increase in age.

TABLE I

AGE DISTRIBUTION

AGES (YR.)	NUMBER IN GROUP	NUMBER IN CLINIC	PROPORTION
4-6	6	19	1:3
7-8	14	27	1:2
9-10	23	22	1:1
11-12	21	15	7:5
13-14	23	11	2:1
15 and over	13	6	2:1

TABLE II

INTELLIGENCE DISTRIBUTION

I.Q.	NUMBER IN GROUP	NUMBER IN CLINIC	DIFFERENCE
Morons	0	20	20 less
70-90	22	32	10 less
90-110 (normal)	51	36	15 more
110-160	27	12	15 more

Intelligence.—The intelligence quotients of the complaining group ranged from 72 to 159. This was higher than was expected by comparison with findings in the child guidance clinic as a whole. Fifty-one of the one hundred children were in the normal range from 90 to 110; twenty-two were below 90, the lower limit of normal (fourteen dull, eight borderline, no morons); twenty-seven were above the upper limit of normal which is 110 (twenty from 110 to 130, five from 130 to 150, and 2 above 150). Comparing these figures with those compiled on 500 consecutive entrants into the child guidance clinic, it was found there were no morons in the group as against twenty in the guidance clinic; in the range from 70 to 90 there were twenty-two (14 dull) in the group as against thirty-two, or ten less; in the normal range from 90 to 110 there were fifty-one in the group as against thirty-six guid-

ance cases, or fifteen more, while in the range above normal, from 110 to 160 there were twenty-seven as against twelve, or fifteen more. Apparently the incidence of physical complaints without organic basis increases with intelligence, as well as with age.

Duration of complaints varied from one month to six years, the short-time cases (under one year) averaging four months and those over one year averaging two years and two months.

COMPLAINTS (ALWAYS SUBCONSCIOUS AND REAL TO THE CHILD)

The highest number of complaints (ninety) was centered about the "*stomach,*" with fifty aches or pains and forty complaints of nausea or vomiting or both. In addition, the children reported: "My stomach quivers like teeny earthquakes," and "It feels like the veins in my stomach are broken"; "I have a pain in my stomach, sometimes here [hand over heart] when my mother or father holler at me or hit me"; "I get cramps in my stomach when I'm afraid something bad is going to happen." The *head* came next on the list with thirty-eight complaints of aches and pains, along with "My head twists," "I feel drunk in the head," "Something squeezes inside my head," and "I've got a stiff bone in my head." The *heart* took third rank with a score of thirty-three, including twenty-two heart pains in various parts of the chest and such miscellaneous items as the symptoms of decompensation in a young lady in love with a heart specialist. They also said: "My heart skips and jumps," "presses," "feels funny," "sizzles," "goes off like an alarm clock" and "nearly stops and I think I'm going to die" (rate, 85); "Sharp heart pains that run through my body in three minutes and into my back like lightning"; "I have heart pains like mother and have to lay down like her"; "I have heart pains that go across my body and down my legs" (the mother had died recently of heart disease); "I have pains like Grandmother that run right through my heart and sometimes over my heart." *Eyes* were next in importance, twenty-seven blurring or hurting, seeing double or not seeing at all (13 per cent of the nonreaders insisted they could not see the words with normal vision); the eyes of one child hurt if he chewed gum at the movies. Twenty took refuge in dizziness, while five felt faint or fainted, one saw black spots. For one, "things turn black." Fourteen simply could not eat ("Sometimes I choke the way Father did when he was a boy"); five could not sleep; five others could not speak; three could not swallow; and two could not walk. *Legs* proved useful in finding alibis for fourteen, usually by pinning on the label of pain in odd spots; others varied, as "My legs go numb on me," "collapse," "become paralyzed" (although recovery took place with one every school morning at 9:10). The aches and *pains* of thirteen were vague and elusive, flitting hither and yon regardless of the anatomy or physiology of the

body. Ten had such "weak spells" that at times they could not face their companions, do their chores, or go to school. "Often I'm too weak to lift my head from the pillow in the morning." Nine had gasping spells or couldn't get their breath—"Mother thinks I'll die." Six found stubborn constipation to be a satisfactory complaint, but diarrhea was brought on in one child only and that when her teacher used stopwatch pressure on the class. This child was treated for amebiasis by a physician, but her symptoms disappeared only after she was removed from that school. Three dull, backward children preferred convulsions before school to the humiliation of school failure.

Besides single scattered ones, pains were complained of in the chest in five cases; knees, five; shoulders, three; back, three; joints, three; hips, three; muscles, two; hand, two; and throats three, in one of which it was a "pain that goes to the ear, round the eyes and straight into the head." "I get a pain in my throat when my parents quarrel." Whenever the nails of two neglected children, a boy of 10 and a girl of 11, were trimmed, the children screamed with pain and were sick afterward. Two suffered from "glands," one having a "weak gland" and the other some glands that "moved about my neck, so tiny they couldn't be seen except with a microscope, but Dr. E. said they would have killed me in one day more if he hadn't saved my life." Miscellaneous complaints were: "hears voices"; "feels queer"; "staggers";

TABLE III

COMPLAINTS

Localized Anatomically				*Unlocalized*	
"Stomach"	90	Joints	3	Excretory	9
Head	38	Hips	3	Respiratory	11
Heart	33	Throat	3	Nervous	18
Eyes	27	Muscles	2	Digestive	18
Bowels	8	Hands	2	Circulatory	35
Ears	6	Nails	2	Unclassified	15
Chest	5	Glands	2		
Knees	5	Side	2	*General*	25
Feet	4	Nose	2		
Shoulders	3	Kidneys	2		
Back	3	(Single)	8	Total number	384

TABLE IV

KIND OF COMPLAINT

Pain	183	Inability to sleep	5
Nausea, vomiting	40	Inability to speak	5
Dizziness	20	Inability to hear	3
Faintness	15	Inability to swallow	3
Inability to eat	14	Inability to walk	2
Impaired vision	12	Convulsions	3
Weak spells	10	Itching	3
Gasping spells	9	Numbness	2
Inability to see	9	Cough	2
"Don't feel good"	9	Paralysis	2
Constipation	6	Single or bizarre	27

"tingles all over"; "people look very small and far away"; "nose is spreading"; "pain like a fog for two or three days"; "feels like there's nothing in me"; "my navel is soft"; "sometimes I feel dead"; and "I know I'm going crazy like my aunt that came back from the asylum."

Mechanisms Used.—In adopting physical complaints without organic basis, the mechanisms used varied as the child attempted to

(a) exaggerate previous simple sicknesses;
(b) repeat or prolong symptoms of his own serious illness or operation;
(c) imitate symptoms of relatives, or hearsay accounts;
(d) follow suggestions dropped by doctors, oversolicitous acquaintances, or hypochondriacs;
(e) repeat symptoms experienced during fear or anxiety reactions;
(f) use imagination or fantasy.

In cases followed from the beginning over a long period of time, it was found that the initial complaint was usually an isolated symptom, but, if the intolerable situation for which it was adopted did not improve, the number of complaints increased and spread throughout the body. Part of these had their origin in the visceral repercussions to strong emotional disturbance, causing such symptoms as gasping, choking, faintness, nausea, weakness, sweating, frequency of micturition, etc. All this is most confusing, mystifying, or frightening to the ignorant child to whom sickness is rarely thought by adults as worthy of any explanation. The meaning of death also is evaded by adults, the child's questions being left to the shocking explanations of other children, the most frequent one in this series being that the dead are "put in a hole in the ground and eaten by worms."

Physical Condition.—Reports of examining doctors were available in seventy-nine cases. (Home reports only were obtained in the reading cases.) In general terms, seventeen of the seventy-nine were in good physical condition, thirty were below par, and thirty-two were in very poor condition. The seventeen who were in good condition had all gained what they needed to solve their problems, although nine of them were showing unwholesome changes in personality, and three more serious changes. One of the latter had aphonia of one year's standing; another, paralysis and threatened suicide for one year; and the third, a girl who had been unnoticed by the mother except when sick, an endocrinopathy with voracious appetite. This last patient, at 14 years of age, had had two operations besides numerous hospitalizations, a gastrointestinal series, sulfur baths, violet ray and electric treatments, diathermy, and treatments by a chiropractor which had helped her more than anything else. Of the eight showing no physical ill effects whatever, seven had complaints of short duration, with success in gaining the

needed relief through revenge, trips, cessation of overwork, distraction from psychic trauma, etc. The long-term case was that of a 10-year-old boy who had become very secure in his environment where he gloried in being brought up as a girl by an unbalanced, overdoting mother.

Physical examinations were all negative for organic basis to referral complaints, although in two cases in which vague heart complaints were part of the admixture of symptoms mentioned, organic heart disease became demonstrable between one and two years later; in the meantime, the intolerable home or school situation had been bettered (both children were dull and under too much pressure), and the mental health was improved so that the patients were in a better condition to adapt themselves to the restricted heart regime. Four others applied the power found in the heart weakness of influenza to a solution of problems (but not at inconvenient times, such as in the playing of basketball and football by a neglected boy, the middle one of ten children). The two children with chronic heart disease did not complain of heart symptoms at all but of fanciful complaints brought on by overwarning and dispelled by a wholesome social life and amelioration of troubles. Malingering was found in one of the eye cases; in another, one could only sympathize with the blurred vision of a little fellow from a well-to-do home who had to put to bed his drunken mother who swore, hit, kicked, and bit him, and pulled his hair—a story told by the boy in a monotonous, hopeless tone. To rule out possible mistakes in diagnoses, 14 per cent were given special laboratory services, such as basal metabolic rates, Addis counts of the urinary sediment, spinal fluid examinations; 16 per cent were given various x-ray examinations; 20 per cent were sent to special clinics; 20 per cent were sent to the Stanford Convalescent Home or to health camps as therapeutic tests; and 30 per cent were hospitalized with all the usual attendant services, as well as special ones thought to be of value. The operations on the three children (one child had two) for the hypochondriacal complaints were performed elsewhere.

Examining physicians noted in 60 per cent of cases extreme, even bizarre, or abnormal nervous movements which in several cases had to be differentiated from chorea. Ten were described as being weak and tiring easily. Sleeplessness was charted in forty-two, and no appetite in forty-nine, although in brief histories such items often were not included.

The very poor physical condition of the thirty-two and the below par state of the thirty seemed to evolve not only from oft-repeated somatic responses to intense emotional disturbances in these children's lives, but also from the chronicity of the physical symptoms—circulatory, digestive, nervous, or otherwise—which led to habitual dysfunction. A partial list of anxiety symptoms taken from a textbook is not

TABLE V

MAJOR NEEDS SERVED BY THE PHYSICAL COMPLAINTS

a. Sixty children needed to drive out thoughts of frightening experiences they were powerless to alleviate, by taking on pains and aches that might be alleviated:
   Seventeen serious illnesses of the child himself, as osteomyelitis, poliomyelitis, tuberculosis, operations (see Case 1);
   Eleven with a death in the family, three of cancer cared for by the child, one but 5 years old (see Case 2);
   Seven severe heart attacks of a parent (see Case 3);
   Five serious illnesses of family members, such as gastric ulcers, hyperthyroidism, kidney-stone colic, etc. (see Case 4);
   Eight cases of abuse of mother by drunken father (see Case 15);
   Six cases of physical abuse of child by stepfather (two, drunken) (see Case 5);
   Two overprotected children whose socialite mothers became beastly drunk;
   Four children with an insane member returned to the family circle (see Case 7).
b. Thirty-eight felt a need either to escape school (twelve) (see Case 8) or to provide alibis (see Case 9) or compensation for school failure (see Case 10) (including sixteen intelligent nonreaders); only six of all of them had I.Q.'s below 90, the others extending up to 121, 130, 143, and 159.
c. Thirty-six needed more attention, sympathy, or love:
   Twenty from unloving parents (rejecting, brooding, self-centered, worried) (see Case 11);
   Nine to retain power that threatened to slip (six, grandmothers);
   Seven because they were ignored after arrival of idolized younger sibling (see Case 12).
d. Eighteen needed an alibi or compensation for social failure (see Case 13) or social deprivation (see Case 14). Fifteen were nonreaders.
e. Fifteen needed to ward off indefinite, formless anxiety (talk of death, banishment, sex fears, alarming warnings about boys and men) by adopting a definite form of sickness which might be cured (see Cases 15 and 16).
f. Ten needed illness to raise them from the ignominious, undeserved position assigned to them in the family (see Case 17).
g. Eight needed disease symptoms to reach the plane of hypochondriacal members of the family (see Case 18).
h. Seven needed symptoms to reach the expectations implied in frequent oversolicitous questions (see Case 19).
i. Six needed incapacitation as revenge for overwork, unfair criticisms, lack of protection from disease (see Case 20).
j. Five needed a period of sickness as release from pressure of exploitation (boy of 5 for college) (see Case 21).
k. Four needed to atone for guilt feelings (accident, hostility, sex practices) (see Case 22).
l. Four needed familiar illness to ward off terrifying ones suggested by demoralizing (and indefensible) remarks made by doctors in their presence, even when whispered (see Cases 23, 24, 25, and 26).

dissimilar to the entering complaints of these children: deranged gastric functions, palpitation, breathlessness, anorexia, constipation, diarrhea, sleeplessness, twitching of muscles, weakness of limbs, tremors, tics, pains, blurring of vision, speech difficulties, such as aphonia, and general fatigability.

The bewilderment, distress, and fears brought about by these symptoms added to the chronic dysfunction of the organs concerned, creating a vicious circle. Poor eating and sleeping will bring any child below

par. Add to this circulatory, digestive, or other dysfunction of bodily systems and one can hardly expect other than a poor physical condition to follow in time. However, somatically the heaviest toll was taken of the nervous system.

Needs Expressed by the Physical Complaints.—The most striking phase of this study was the finding that, in a large majority of cases, back of the unfounded, bizarre, or absurd complaints were distressing, even intolerable, situations or serious, complex problems much beyond the abilities of these children to solve. Their physical symptoms were merely their crude, blind attempts to better the situations or to solve the problems according to their needs. Their needs varied with the character and severity of the individual problems, with the individual personality of the child, and with his security in his home world, his social world, and his school world.

The major needs that were found and the situations giving rise to them are presented in Table V. A case history illustrating each subdivision will be found at the close of the article. There were twenty cases with but a single major need; the rest presented two or more major needs, making a total of 201.

Table V does not include many minor needs with cumulative effect, nor the fears and anxiety from movie horrors and radio crime which can cause anorexia, sleeplessness, extreme nervousness, ties, and other symptoms of fearfulness often resulting in a state of malnutrition (see Case 27), nor various forms of social maladaptation so important to adjust if normal living is to be attained.

MENTAL HEALTH IN RELATION TO PHYSICAL COMPLAINTS WITHOUT ORGANIC BASIS

As would be expected, symptoms of mental ill-health of varying degrees must needs accompany continued physical complaints without organic basis as the whole organism becomes involved in the resultant actions and reactions. In this series only 6 per cent escaped, and these were short-term cases adjusted with little delay. Otherwise, the symptoms of mental ill-health extended from slight beginning symptoms to those regarded as serious threats to the integrity of the personality.

Classification of the grand total of 605 symptoms of mental ill-health that were found gave six divisions: antisocial behavior (12 per cent); lowered learning ability (13 per cent); organ malfunctioning (16 per cent); emotional instability (28 per cent); beginning retreat from reality (20 per cent), and serious withdrawal (11 per cent). Under *antisocial behavior* were found truancy, defiance, lying, destructiveness, stealing, and revenge—a total of seventy items. Under *lowered learning ability* were the items: inability to give attention or concentrate; loss

of self-confidence, initiative, or interest; easily confused thinking; failure of memory; poor accomplishment; and lowered I.Q. (eighty-four items in all). Under *organ malfunctions* were: night walking, terrors, etc. (twenty-five); stuttering (eight); enuresis (thirteen); excessive nail-biting (twenty-eight); ties (twenty); and incontinence (two). Under *emotional instability* were: weeping spells (four); trembling spells (five); extreme irritability (eight); "wild" spells (ten); loss of control over trifles (eleven); easy shedding of tears (twenty-six); oversensitiveness (twelve); an apprehensive attitude (thirteen); worry over everything (fourteen); anxiety most of the time (fifteen); and excessive fears, with sixteen fearing dying (fifty). Under *beginning retreat from reality* were: inability to work with others (four); an unusual degree of inferiority (four); babyish reactions (fourteen); inertia, with vacant expression (six); undue timidity, or shrinking (thirteen); thoughts turned in (seven); excessive daydreaming (twenty-nine); and avoidance of others (forty-five). Under *serious withdrawal* were: feelings of persecution (four); regression (five); religious or sex preoccupation (four); withdrawal within self (eight); death dreams and suicide threats (seven); dazed, queer, or silly actions (eleven); unusual brooding, moodiness, depression (fifteen); and hallucinations or compulsions (twelve).

Judging by the frequency of the occurrence, some deductions may be made from the above as to prevention, i.e., noting for investigation such symptoms as: (a) excessive daydreaming and thoughts turned inward (thirty-six listed items); (b) easy shedding of tears and loss of control (thirty-seven items); anxiety, apprehension, and worry over everything (forty-two); excessive fears (fifty); avoidance of others and other social maladjustments (seventy); and lessened ability to learn, such as in giving attention (eighty-four).

Treatment.—Preliminary to treatment, the physical status of the patient is always determined in order to make allowances in reactions and also to rule out organic causes for the complaints, although some patients are referred in which an organic cause may be present, but not considered sufficient, in the judgment of the examining physician, to bring about the symptoms in the complaint.

In handling cases, the technique is simple and direct. As in medical work, a thorough history is necessary to avoid focusing attention on one symptom, usually the presenting complaint, to the exclusion of others which may be more important. The root of the trouble must be found if treatment is to be successful. The underlying causes may have ramifications throughout the child's life and the presenting complaint is usually but one manifestation of the underlying syndrome. The history is taken from the parent first, in a sympathetic manner so as to gain the emotional setting and relationships without which it is

of little value. Clues as to contributing factors are followed wherever found, whether in the family history, home environment and family life, personal history and health, social life and adaptation, school life (teacher, work, classmates, and schoolyard), personality traits, habits, conduct, or activities. In every case referred, no matter what the complaint-problem may be, all possible maladjustments are searched for in order that adequate treatment may be instituted. School adjustment is scrutinized most carefully since the symptoms arising from school maladjustment are displayed even more freely in the home than in the schoolroom.

The "hour with the child" is analogous to a physical examination made to verify facts and confirm or discard impressions gained in history taking as well as to search for other evidence of pathologic processes in the patient himself. A most important point in the beginning is that of gaining the child's confidence by treating him with respect (not exaggerated friendliness or horseplay) and in an interested, noncritical, understanding manner, accepting disclosures in a matter-of-fact way as if expected, and looking at the situation through his inexperienced and confused eyes. He is led to talk of his playmates, school successes and failures, likes and dislikes, his interests, habits of eating, members of the family and their treatment of him, fears, daydreams, health, worries, wishes, movies, and radio. Clues are followed or dropped as the pieces of the jigsaw puzzle fit together. Throughout the interview every opportunity is utilized to reassure the child as to his health or other worries, to build up confidence to meet the problem, to dispel fears, and, as the situation unfolds, to build up an understanding of the underlying principles and how best to face them.

A conference with the parent follows, and a picture of the situation is worked out, followed by a discussion of advisable measures. Both parent and child decide on points of attack and return at intervals to gain support and further enlightenment, much as in medical practice, where also permanence of treatment results cannot be maintained without close follow-up. Frequently it is found that the parents are so close to their problems as to lose perspective; however, gaining it by discussion, they are most cooperative in modifying or changing attitudes and tactics, instituting new methods and earnestly working for the desired outcome, and often insisting that everyone in the environment do likewise. The object is kept in view of gaining insight and independence in attack on problems and the maintenance of a good state of mental health comparable to a good state of physical health.

Outcome.—In tabulating results of the seventy-nine on whom treatment was started, it was found they fell into five divisions: failure; improvement of some symptoms; satisfactory in that complaints disappeared, but all disturbing factors could not be cleared up; thoroughly

satisfactory results in which everything was cleared up; and, last, loss from observation. Of the total number followed, thirty-nine (54 per cent) were thoroughly satisfactory as to outcome, and twenty-two (30.5 per cent), satisfactory (making a total of 84.5 per cent with satisfactory outcome); two had improvement in some symptoms; nine (12.5 per cent) were failures; and seven disappeared. As these results looked rather high in successes, the cases of the year from July 1, 1938, to July 1, 1939, were tabulated alone. In these, 47.6 per cent were thoroughly satisfactory, and 38 per cent, satisfactory (85.6 per cent total); 5 per cent improved in some symptoms; 9.5 per cent were failures; and two were lost to view. A higher degree of cooperation than usual was gained from all concerned (such as four abusive stepfathers), possibly because physical health was involved, which is something definite to be seen and measured, rather than mental health alone, which is a newer concept and is not concrete. This may contribute to the higher percentage of satisfactory results than in a regular child guidance series, usually given as 75 per cent. While a gain in weight or physical condition had not been definitely looked for in treatment as an index of outcome, a survey of the charts showed an increase of weight of from 2 to 10 pounds in 40 per cent and the notation of better physical condition in 10 per cent more after treatment; otherwise, the physical condition was uncharted beyond such terms as "fine," "O.K.," "no more trouble," "much improved," "much better," etc. In thirteen cases, changes in school teacher, program, or of school attended brought about solution of the problem; in seven of these the school was the only problem (non-readers not included because untreated).

The *length of time* these cases were followed varied from one month to seven years, depending upon the severity and complications of the problems to be solved, the personalities concerned in the environment, and how deeply the behavior pattern had become set. One was followed for one month, one for two months, eight for three, eight for four, and seven for five months. For from one-half to one year eighteen were followed; from one to one and one-half years, ten; from one and one-half to two years, four; from two to three years, six; from three to four years, two; for four years, three; for five years, one; for seven years, two; and for eight years, one. The average was sixteen months.

The *final outcome* was judged by the writer or the other child guidance physician in thirty-seven cases, by interviews with both parent and child in twenty-nine, and alone with six adolescents and two younger children. The social worker determined fifteen by home visits; parents reported on ten, the school on two, and the referring physician in the children's clinic on eight cases (three adolescents and five parent and child interviews). These final reports were also supplemented in twenty-three cases by another member of the group. Valuable aid was given by physicians in the children's clinic who were interested in such cases by

their comments in the charts over a number of years. One chart covered a period of seven years which terminated when the Irish mother confessed the father's intense jealousy of the child and was assured it was probably the cause, whereupon she dressed herself and the boy for travel, confronted the husband upon his return from work with two packed suitcases in the middle of the kitchen floor, and announced with arms akimbo that they were leaving for Los Angeles if he did not change his tactics at once; the results were capitulation and cure.

The failure cases, with the exception of a beginning schizophrenic, deeply involved the mothers, one of whom was a drunken socialite, one a hypochondriac of the deepest dye, one who trained her boy in malingering, one mentally unbalanced, and four who had no love for their children, two of these worshiping the smaller brother.

DISCUSSION

Cases of physical complaint without organic basis are worthy of study rather than impatience and annoyance at the loss of time from organic cases.

Superficially it may look as if pains were simulated merely to gain attention, but such cases form but a small fraction in this study.

Causes were found to be not trifling, but significant of need for outside help in meeting the problems the children were trying to solve by physical complaints without organic basis. In the majority of cases, distressing and often intolerable situations were discovered.

This condition may, as dysfunction becomes chronic, lead to as serious a physical condition as complaints *with* physical basis.

One object of studying such cases is to prevent this pattern of reaction from becoming deeply set and to restore these patients to normal living.

Those patients who were succeeding in solving their problems in this unhealthy manner (usually short-term cases) maintained their usual physical condition. The others, when helped to the solution in other ways, again returned to a satisfactory state of health. Those whose troubles could not be ameliorated tended to continue in the same way in order to gain some comfort while having to endure their trials and tribulations, and their physical condition did not improve but tended to be lowered.

In attacking such cases, a study of the child's emotional life and relationships in home, social, and school circles is essential. In this investigation, the factors found most helpful as clues to causes were: frightening experiences of the patient; school problems, especially in intelligent children; lack of parental love (dislike of offspring is not uncommon); social failure, especially avoidance of other children; anxiety over the meaning of death; threatened banishment; sex and

other psychic trauma; contact with hypochondriacs and oversolicitude in family members; and exploitation by overambitious parents and teachers.

Symptoms confirmatory of serious trouble were found to be: excessive daydreaming; crying and going to pieces easily; being anxious or worried much of the time; being filled with fears; playing alone; and lessened ability to learn, in the case of intelligent children.

Cooperation by persons involved in the problems was surprisingly good, higher than the average of child guidance cases, perhaps because physical health is a concrete, visible state, improvement in which is roughly measurable and is realized to be highly valuable, while mental health is intangible and less understood.

Much expense could be saved in the present and much hopeless, irritating shopping from doctor to doctor later by early detection and treatment.

Early recognition can lead to a possible prevention of chronic invalidism and chronic neurotic illness.

CONCLUSIONS

One hundred cases of physical complaints without organic basis were studied, twenty-one of them being those of intelligent pupils who, through no fault of their own, had not been taught to read.

In over 95 per cent of the cases, complaints were found to serve a definite and important need in the children's lives, that of ameliorating intolerable situations or of solving intricate problems beyond their powers.

Continuance of these complaints had impaired the physical health of four-fifths of these children.

Only 6 per cent (those whose problems were of short duration and were adjusted in a short time) escaped symptoms of mental ill-health in varying degrees as the whole organism became involved.

The outcome of treatment was unexpectedly successful, with loss of complaints and restoration to health in 85 per cent of the children.

These satisfactory results were accomplished by simple, direct, and common sense methods of treatment without the use of highly specialized techniques.

PROTOCOLS

CASE 1.—A very pretty girl of 14, with an I.Q. of 116, depressed and lying in bed, utterly refused to try to use her right arm after bleeding into the right wrist had cleared up, which was the last of the four years' joint hemorrhages, each necessitating long hospitalization, the last one already eight months long. The medical diagnosis was Schönlein's disease.

Situation.—This intelligent girl had been winning a race with her older brother in school until the hemorrhages began. She was also very fond of a little sister who was not allowed in the hospital. Sports, recreation, and numerous friends had been cut off. With nothing to occupy her intelligent mind, her thoughts had

turned in on herself, and she began to feel she was different, that she had not been protected like others from such a terrible fate, that the future held nothing of worth for her. She took to brooding and refused to eat; her personality seemed altered. She wanted to be alone and have the curtains drawn closely about the bed, and she talked to the nurse of suicide by cutting her wrists with something sharp.

She was given more companionship, interesting reading material, and special teaching to make up for lost time, supplied with the art material she craved, and observed very closely by a cheerful social worker. It was an uphill struggle, but the depression was overcome. She was tempted into using her arm and improved to the convalescent stage when she was sent to a convalescent home where she found a congenial chum; at the end of two years, she was returned to her home in a normal condition.

CASE 2.—A tall, dreamy, gangling youth of 15, with an I.Q. of 82, came in because of "funny spells" in which he became dizzy, saw black specks, and had stomach-aches that doubled him up. The medical diagnosis was physical complaints without organic basis. The physical examination showed the patient to be below par and to have congenital syphilis and evidence of healed tuberculosis of the spine.

Situation.—The spells began six months previously, shortly after seeing his father die of cancer, having been with him throughout his illness. Pertinent past history revealed that when he was 3, he became terrified as he called and hunted for his mother in the empty house from which she had been rushed to the hospital where she died. While waiting outside the funeral parlors, some children talked to him, and he screamed in a frightened way, ran into the parlors, and could not be quieted down. He sobbed for two hours. About three months later he asked the grandmother who had been watching him play if she would like to have his mother come in; he went out again, spoke as if to someone, acted as if leading a person in, stepped aside at the door as if to let someone pass, came up to the grandmother and carried on a conversation with her and the invisible person, held out his hand as if leading the mother out, talking and smiling happily. The grandmother wept in relating this. A year after the mother's death he saw a horse killed and became hysterical; then he saw an accident in which a man was killed. After his pet dog was run over and killed in his sight, he carried the dead dog around crying, "Now, I've nothing left to love me." He still had bad dreams of death and for years has lain awake for long periods at night, fearing he was about to die. His next worst fear is of an insane man's getting him. He dreams frequently of jumping off high buildings to his death.

The grandmother cooperated well in measures to make the boy feel more secure in his new home with her instead of with the shiftless stepmother, by increased approval for any success whatever, by his taking on given responsibilities, by giving him opportunity to earn some spending money, and by recognizing his adolescent craving for prestige by discussion, consultation, and guidance as much as possible, instead of bossing, ordering, and dominating as his immaturity would invite. His inability to gain high marks in school on account of his dull mentality was explained to the grandmother and the school and pressure was lessened by both. The "spells" gradually became less frequent and intense, and one and one-half years later he said they were gone. Later the grandmother wrote in her thanks "because he is 100 per cent better in every respect than two years ago."

CASE 3.—A sweet, attractive little girl of 10, with an I.Q. of 97, complained that she "didn't feel good," and felt as if she were dead, and said that "things aren't real." The physical examination was negative. In the child's story she says she worries too much over her mother's health and is afraid she will have to go to a hospital for an operation and never come back again. She is terrified over her father's illness; he has "rocks in his liver," "can't sleep because his heart hurts so, groans something awful, gets mother up, and his heart makes noises like a cat meowing." She knows he will never come back from the hospital. She just feels that a kidnapper is going to come into her window, nab her, and take her to a basement where he will keep her tied up with a stream of water dropping on her forehead. She dreams her terrible fever dreams of monkeys chasing round and people with crooked backs and things over their heads. To get to sleep she imagines clouds of bright dots going around and around over everything and often many colors moving in and out and all over.

The mother has followed the practice of taking her to funerals and showing her the dead in their coffins ever since she was 4 years old, which she now likes because it makes her "feel so sad." Just before coming to the clinic and after attending her godmother's funeral, she was "awful nervous" in school and thought she felt dead like the godmother and "got real dizzy" when she thought of how sick her father and mother were and how they would look in their coffins and "just about ate up" her handkerchief. Sometimes in school she feels as if she might be in a sleep and her hand and foot don't seem to belong to her. The crowning shock, which occurred two months after the onset of menstruation for which she was unprepared, consisted of going to the San Francisco Fair. Wandering away from the rest, she came to the part that showed how babies were born. She turned sickish, felt very dizzy and queer, and could hardly stand it; she wished she had never gone to the Fair and was sorry she had ever learned such a thing. That was when the people around her didn't seem real, but very far away and very tiny.

The origin of the fears was discussed with the child who was quick to grasp the significance. Complaints ceased, and she gained 4 pounds in three months.

CASE 4.—An undersized, frail boy of 6 years, with an I.Q. of 104, complained of a cough like his father's, pain in the kidneys like mother's, dizzy spells, pains in his stomach, and fainting spells, for two years. Physical examination showed malnutrition, with the child in a very poor condition.

Situation.—The sullen, ignorant, drunken Central American father compensated for his inferiority by abusing his educated, intelligent wife and rejecting the patient for a little brother. The patient had been badly burned on the body with hot lard when he was 4. The boy was greatly attached to the grandmother who suffered terribly before her death from cancer when the boy was 5. Later the mother confessed that the little fellow had had to care for the grandmother in the daytime for the last months before her death, as she had wanted to work. Even now he often says to his mother, "You look sick. Have you got cancer? Are you going to die and be put in a hole in the ground for the worms to eat and leave me alone?" After the grandmother's death and the grandfather's departure because he couldn't stand the son-in-law, the boy began twitching, grimacing constantly, giving a nervous laugh that nearly drove the mother crazy; he became hyperactive and destructive, stole, masturbated, smeared his food about, and became very irritable and distrustful, fighting and kicking if the grandmother's name was mentioned.

Methods of making the boy feel more secure were discussed with the mother, although conditions looked bad. The boy was sent to the Stanford Convalescent Home where he behaved very well, but in fifty-three days he gained only three-fourths of a pound. At the end of a year, the ties had disappeared, stealing and masturbation had been overcome, and there was less destructiveness, nervous laughing, and hyperactivity. Three years after the first entry he returned with the previous complaints gone, but still nervous and below par physically. The father was drunk every Saturday and Sunday, fighting "somepin' awful" with the mother. The boy listens to all radio crime programs and is an addict of movie horrors (common with unhappy children). He boasts of running, fighting, and playing basketball better than other boys (all impossible) and daydreams of being the big gangster who leads his "masked men in robbing stores, cracking up jewelry safes and getting at payrolls with my men," and tries not to think of getting caught and put in the electric chair—"They scream somepin' turrible." He would like to be a lifeguard at the beach and save girls. He said he was eating better because his "mother makes such good pie, I eat vegetables to get it!" Since the father insists on the radio crime for his own enjoyment (not uncommon), the mother parks him in the movies to get him out from under foot (common), and the parental fighting has become chronic. It looks as if the nervousness will become chronic also.

CASE 5.—A timid, pale, frail boy of 11 (if the correct age was given by the stepfather, who changes names, ages, and history of the family frequently), with an I.Q. of 77, complains of his head hurting, faints, trembles, "feels drunk in the head," and has had vomiting spells with fever (for which the mother gives him coca-cola!). Physical examination showed the child to be in very poor condition, and he was sent in to the hospital for skull plates and observation.

Situation.—The good-looking, smooth, sarcastic stepfather is a chronic alcoholic lying around and refusing to look for work, who has often struck the mother

in the presence of her children; he enjoys badgering and bullying the children until they break, becoming furious "if they look straight ahead and a film seems to drop over their eyes," he says. The mother complained that the $3.50 cure for alcoholism that she borrowed money to buy from the drugstore doesn't work because he tastes it every time she puts it in his coffee. The boy is frightened to death of the stepfather who makes scathing remarks about his school work, scorns him for his physical weakness, hounds him continually by calling him dumb and crazy, and so persecutes him that he sits petrified at the table, not daring to ask for or take any more food than is placed on his plate. The mother is not allowed to serve desserts and gives the boy coffee instead of the cocoa that the stepfather gives his own child. The boy's speech is defective, for which he is punished, and he is extremely nervous and jumpy, cannot eat, blinks his eyes, jerks his head, and often just sits in the corner looking vacant and grimacing.

The boy was sent to the Stanford Convalescent Home for two months where he gained 3 pounds and became much less nervous, "quite calm" according to the report. Then the family disappeared, heading for Los Angeles.

CASE 6.—A plump, dainty little girl of 9, with normal intelligence, complains of dizziness, fainting, choking, refusal to eat or sleep, and loss of 10 pounds in weight for a duration of one month. Physical examination was negative.

Situation.—The child has lived the sheltered, protected life of the well-to-do, petted and loved by both parents. The adored mother took to drinking, initiated at cocktail parties and now rationalized as necessary to control nervous spells since an automobile accident. She has now reached the stage of getting beastly drunk, lying about, yelling and acting in a most disgusting manner, and the contrast with her usual delightful, loving self is more than the child can bear. Dissension of the parents over drinking is bitter. One month ago she put her fingers into her mouth, decided she had poisoned herself, and promptly fainted. Another time she choked and insisted she had swallowed a chicken bone and would not eat for three days. She had frequent choking spells attributed to swallowing cotton or an ornament and would refuse food afterward. She refuses to go to bed unless the mother stays with her; she cries and screams, "If you don't help me I'll go batty, I'll go nuts," until the mother comes. If she awakens in the night, she runs to the mother's bed, grabs her, and cries that she's scared. She stopped eating when she discovered a chip off her breakfast plate. When her knife scraped on the plate, she left the table at once. The child screamed that snakes were chasing her like those in the book, that spiders were trying to tear her flesh off the way they did to a man in the movies. After hearing the words of an old song, "I'd rather have fingers than toes," she sat frightened, waiting for her toes to fall off. She took to blinking, rolling her eyes, and jerking her shoulder. Her latest idea was to wash her hands dozens of times a day until they became chapped and sore, and after washing she would not touch any object, even the dining table, before eating.

Outside of quieting the child's fears and talking over her troubles with her (the father refused to have her placed in a school), the important therapeutic measure was to keep the mother sober as long as possible, which proved to be four months. In this period the child's appetite returned; she dropped asleep in five minutes. There was no more choking or washing of hands, no more living out of movie and radio horrors, and she has returned to normal play with children. But the mother has not been heard from since the four months were up, and one wonders how long it will last or has lasted.

CASE 7.—A happy-go-lucky Mexican girl of 14, with an I.Q. of 81, complained of jerking of the head and being "stricken dumb," and also of headaches, dizzy spells, pains in the head, and faintness. "I know I'm going crazy like my aunt that came back from the asylum." Physical examination was negative.

Situation.—A young aunt of 22 living in the home had to be committed to an insane institution, from which she was paroled to the home; recently she had to be recommitted to the institution. One morning the patient overslept when she was to help her cross grandmother do the big family washing. Not daring to stop to eat, she worked hard until 2 o'clock, only stopping for a little watermelon at 11. Some soup and a little rice cooked in rancid lard were served as lunch, after which she turned faint and sick, lay down, and found her head was shaking. Anything wrong with the head meant insanity to the girl, and she was terrified to find that her head had twisted to the right and that she couldn't get it back for a long time. She tried to get up but felt too faint. Her head hurt, and she

was absolutely certain she had gone crazy and lay waiting for the rest of the aunt's symptoms to appear. When the mother returned, the girl looked strange and had been "stricken dumb," and she rushed her to the emergency hospital. The situation was talked over with the girl, and she was assured that being bashful didn't mean there was something wrong with her head. Two months later she was found happy. There were no recurrences.

CASE 8.—A pretty, dull girl, nervous and blinking, with an I.Q. of 80, came in as a result of convulsions, heart trouble, and indigestion of three years' duration. To this were added sinking spells, headaches like the rest of the family, inability to eat, a queer feeling, and dizziness. She feels as if not herself as things around look queer sometimes. The physical examination was negative for all referred complaints.

Situation.—This stupid girl had never been able to get her school work satisfactorily, but was always promoted so she would not feel inferior, as is the modern way. Now, with the hypersensitiveness of adolescence, she could not stand the mortification of never being able to do what her classmates could. She finally burst out with, "I'm nothing but a fool at school. I can't open my mouth without making a fool of myself. I just won't go." The convulsive attacks were feigned before classes in order to be sent home or at home in order to escape school. All the complaints were brought on by school. She became nonsocial, easily confused, took on fears of elevators and street cars, was sure she was going crazy, and when she felt numb, was sure she was going to die.

She was placed in a small special class within her abilities, and in the three years that followed, she had no complaints beyond indigestion every time a new subject was taken up.

CASE 9.—A timid boy of 12, with an I.Q. of 120, complained of being faint, dizzy, not hearing well, "eye awfully bad and may go blind," and "bad headaches helped by baking soda." He has to "lay down and take Alka-Seltzer for stomach-aches." "Something squeezes inside my head," his heart bothers, he has pains in his hands, leg, and different places, and often feels weak. Physical examination was negative outside of malnutrition, extreme nervousness, jumpiness, and twitching; an electrocardiogram and fluoroscopy disclosed nothing unusual.

Situation.—The family were federal transients, living in one small room with a closetlike place for cooking. The father was a crude, hard-drinking, heavy-handed steel worker who despised the boy as a sissy. The neurotic mother took Lydia Pinkham's Compound in order to have a girl baby and resents this boy greatly, pushing him away if he becomes affectionate and threatening to send him off, although she consoled herself by using powder, rouge, and lipstick on him, putting waves in his hair, and teaching him to sing, dance, sew, embroider, and cook. The mother suffers from menopausal flowing which frightens the boy so badly that he has to tell the principal and teacher about it, embarrassing them greatly.

At school his lot is little happier. Boys refuse to play with him because he is a sissy, even when he steals money to treat them. His "crabby" teacher, in the presence of the social worker and in a loud voice, called him stupid before the class, said he was the lowest in the room, very careless, and nothing but a sissy; the boy was white, winced, and tried to keep from crying.

The case seemed hopeless, but the father was tackled as a "he-man" smart enough to develop skills in sports to give the boy standing with "regular guys." The weepy mother tearfully agreed to stop treating him as a girl and to cease talking of ill-health in his presence.

The father rustled a job and was very proud of moving into a three-room place with an enclosed porch for the boy. With explanations, the very cooperative school principal removed the boy from the "crabby" teacher's class to a higher grade with a kindly, understanding teacher. The boy was sent to the country later where he gained 7 pounds. When asked to appear before a set clinic to explain the disappearance of his functional pains for the benefit of the young doctors, he quickly agreed because he saw "it might help them save millions of lives." A year later the cooperative principal rang up to ask advice on planning a new program for the boy, which she followed most satisfactorily. She reported having a talk with him and being surprised to find he had gained poise, was calm, did not flourish his hands about at all, and seemed very intelligent. (Success so far, but fingers crossed, hoping scholastic success may bring continuance of the parents' attitude.)

CASE 10.—A girl aged 7, with an I.Q. of 110, complained loudly of epigastric pain whenever she could not do her school work, had to stay after school, or her mother left the house. She was a fat girl with a piggy appetite, exceedingly nervous and weepy.

Home Situation.—The obese mother of 42 despises her husband as an inferior unable to support her in proper style, and she passes this on to the patient who looks just like him and has all of his irritating characteristics, constantly finding fault and threatening to send her away or leave her. The child now stutters, bites her nails, wets the bed, and has become nonsocial. In a desire for culture and to cure the girl's masturbation, the mother took the girl with her to a nudist camp for the summer where the nude state embarrassed her for "only a minute, as everyone there was so lovely and talked such high, uplifting thoughts"; cure resulted. The mother admitted her deep dislike for the child but thought she could overcome it and make the child happy; however, she failed utterly, probably because she needed her as an outlet for the exasperation she could not vent on her husband. The outcome was failure.

CASE 11.—The patient was a likable boy of 7, with an I.Q. of 134.

Situation.—The boy couldn't speak at school and often did not feel well enough to go. He was an only child and grandchild and was made the center of attention, taught stunts and tricks for an admiring audience. Then he was suddenly ignored when the new baby became cute, pushed into the background, and reproved by all if he tried to gain attention. Nothing he did was right. He became very timid, alternating with boisterousness or clowning. As disapproval continued, he began to attract attention by misbehavior, tore the wallpaper off, smashed his toys and the perfect baby's also. Then he began to act babyish like the greatly admired baby. He became shy, cried easily, became very jumpy, couldn't get to sleep, wouldn't stand up for himself, and began avoiding others. He still was treated as a criminal. To get him out of sight, he was sent to a school in which the term was seven months over, which meant he knew neither the work nor even the games the others did; he found himself ridiculed by everyone and an inferior here as at home. He lost his voice and could not speak either in the schoolroom or the yard.

The injustice of the treatment was discussed with the parents, and a line of attack was laid out to restore his position in the home. The parents cooperated very well; there was no school. Full recovery resulted in a short time.

CASE 12.—A scrawny, undersized, sharp-faced boy of 9, with an I.Q. of 104, complained of blurred vision (normal when tested) and inability to see words in the reader. He said his muscles jerked, hands shook, and that he had bad headaches, pains in the belly, and that his "heart goes off like an alarm clock." Being a nonreading case, there was no medical report available, merely the mother's statement that he was in good health, except for being "awfully nervous."

Situation.—The boy was considered perfect at home until he was not taught to read at school by the fashionable method in vogue, after which he was prodded, scolded, called dumb and stupid, and scorned in comparison with a younger cousin and playmates who read well; he was told it was all his fault for not trying harder. When schoolmates ridiculed, taunted, and jeered at him as a "dummy," he could not stand it and flew into rages, striking and fighting wildly, to the delight of his tormentors. During the three years' failure, he became more and more aggressive and antisocial, the more so because he failed also in his beloved arithmetic because he could not read problems. In the classroom he was observed to scrap with the boys in line, to contradict the teacher vehemently, insisting his incorrect answer was right, and to interfere with the success of his rivals. He was reported as a bossy and defiant child, a rebel who would lie, misrepresent, and bully, so acting in any situation, whether crooked or straight, to dominate everything. In the interview he wriggled, twisted, flushed, paled, gave various jerks, chewed his knuckles, wrung his hands, and twisted his hair often with both hands. He could not face his reading failure, saying he read well, until asked to do so. He also could not face his social failure, saying he had "'most a hundred friends." He has become a radio crime and movie horror addict, having a radio of his own and attending movies two or three times a week, preferring "knife killings and where they chop 'em up," of which he dreams.

The physical complaints without organic basis were all used when his school failure, because he had not been taught to read, became intolerable. He could

not face the reality of failure after a record of perfection, was fighting against it aggressively, and was near enough to the breaking point to need the fantasy of reading ability to keep going, hence the abnormal degree of nervousness. (There was no opportunity for treatment.)

CASE 13.—A bright, presentable girl of 14 years, was referred because of a faked attack of chorea. Physical examination was negative, except for the movements observed.

Situation.—Her home was in a bad neighborhood, so the girl had never been allowed out to play with children or to bring any into the home. The boy of 17 now had no friends, no recreation, and could not mingle with others. The dominant old grandmother had been ill with cancer for many months. The girl hurried home after school to wait on her, slept in the room at night, and spent week ends in her service. She greatly feared punishment. Three years before, she had had an attack of chorea which the family considered silly, slapping, punishing, and making her sit on a chair for one-half hour. As there was a possibility of heart involvement, she was sent to the Stanford Convalescent Home which was nearer heaven than anything of which she had dreamed. Last month her chorea returned in a mild form, and she was hospitalized—another heaven with "lovely nurses and doctors and someone to visit with all the time." She daydreamed of going to Hill Farm. The present faked attack expressed her need for social life, and she was sent to Hill Farm. There were no further complaints.

CASE 14.—A fat, simpering, silly looking boy of 14, with an I.Q. of 103 when tested four years ago, but now down to 87 from continued inability to use his intelligence because he had not been taught to read, complained he couldn't see words in the readers and had indefinite pains here and there, which served the purpose of avoiding school attendance. There was no medical record, but he looked to be in a good state of nutrition.

Situation.—The father, a professional man, had always worshipped the boy, indulging his slightest whim, but he was greatly upset over his nonreading. The mother adored him, weeping over his reading troubles. She told how impatient his teachers had been, calling him dumb and stupid, how his classmates made fun of him until he avoided them, how very bewildered he felt over the failure, how much more sensitive and disturbed he was getting, what a restless sleeper he had become, how easily he burst into tears and had his feelings hurt, how he now seemed unable to pay attention or concentrate on what he was trying to do, nor could he remember as he used to. In the school reports it was found that he had compensated for his failure by much misbehavior in school, at first petty offenses to gain the attention he could not get by succeeding, then interference and picking on those that the teacher did teach, followed by hostility to the teacher herself and general misdemeanors. Finally he seemed to give up, withdrew within himself, would cooperate in nothing, sat vacantly doing nothing whatever, and in the play yard avoided everyone. During the seventh year of failure, remedial measures were begun, and he was taught the rudiments of reading for which he was praised out of all proportion to the actual accomplishment (less than reading a simple sentence alone). The approval has been balm to his tortured soul, and when under observation for study, he was going about as if in a daze, with a silly grin or foolish giggle if spoken to, much like a lost cur wagging its tail violently and licking every hand that pats its head. While interviewed he behaved as if acting a part, that of a wonder child in a world of fantasy, the world being perfect, the child perfect in behavior past or present, in athletic prowess, in looks or mental accomplishments. He could not admit his younger cousin or the neighbor boys could read or that he couldn't read perfectly. A report from the school a year later disclosed that the idolizing father had now turned against the boy as a family disgrace for not learning to read, is scorning him, and will have nothing to do with him. The results are bad. The boy is losing his balance; even the children, teachers, and others now speak of him as queer, "goofy." There is no opportunity for treatment.

CASE 15.—A boy of 7, with an I.Q. of 112, complained of headaches, frequent vomiting, turning pale, breaking out in sweats, getting sick at his stomach, and he was afraid that if he did too much he would "feel sick and faint." The physical examination was negative although the physical condition was found inferior; there was excessive nervousness.

Home Situation.—The father was a crude, ugly-tempered, hard-drinking truck driver who beat up the slight mother and boy on every possible occasion. He

had been divorced a number of months ago but continued to visit each week and became ugly, knocking the mother and child down. He had always threatened to throw the boy out of the house or send him to the reform school, which filled the boy with added terror which he wove into his bad dreams. The school complained he could not give attention in spite of his intelligence and could not sit still one minute. The mother could not allow the little sister to sleep with him because he threw himself about the bed, often hitting his head on the bedstead with a thud, and thrashed his arms so violently that he might hurt her. He bit his nails, had night terrors, could not eat, and was unable to face his fears, insisting he was so strong that he jerked the whip out of the father's hand, beat up the big boys that picked on him, would snatch the gun from a kidnapper, and push robbers right out of the window. He dreamed that the father-favored sister got burned up in an automobile accident and the father's hair touched poison on a light and he died. There was no improvement until the mother remarried happily, whereupon the boy lost his complaints and gained 3½ pounds in three months.

CASE 16.—A girl of 12, a dust-bowl migrant, living with six unemployed adults (two men) in one room with a closetlike compartment for cooking in a relief tenement in a bad district, came in with the complaint of inability to use her hand which she had injured by falling on it several months before. Dizziness, faintness, headaches, eye trouble, and inability to think or do book work at school completed her complaints. The physical examination was negative, and the hand healed.

Situation.—When the girl was 4, her mother was rushed to the hospital with a ruptured appendix. She died and afterward was shown in her coffin to the child who has always feared a similar disappearance of the grandmother who took her. About the same time as the fall, the onset of menstruation, which had not been explained, occurred at school, making her "very scared and full of shame." The grandmother finally brought herself to tell of the terrible shock of finding her unmarried girl of 19 in labor pains (the baby was very small). She retired to the bathroom to pray for help to know what to do and got back to their room in time to prevent the girl's repeated attempts to jump out of the window. Setting the grandfather to watch, she prayed all the way to the police station that the Lord might put the words into her mouth to tell such an awful thing. The doctor arrived one-half hour after she had to deliver the baby. Later it was discovered to be syphilitic. The grandmother's blood pressure shot up to 190, and she has to take digitalis and go to Central Medical each week.

With all the family living in one room, there was no escape for the girl; all scenes and recriminations took place in her presence. All of this occurred when the hand should have been well enough to use, but her continued complaints of pain, as well as the emotional aftereffects of dizziness, faintness, headaches, trouble with the eyes, and inability to think and do book schoolwork, served the purpose of turning the family's attention off their troubles to give the girl sympathy and attention.

The girl's vision was proved normal, plans were made for socialization, and she was sent off for the summer to a place where there were plenty of boys to play with to help overcome the grandmother's alarming warnings about the wickedness of boys and men.

The outcome ten months later showed good school work and no more dizziness, faintness, headaches, or eye troubles. She also said she didn't need the most exciting radio programs to shut out her troubles now and hadn't listened to the Devil's Scrapbook for a long time. She has made several friends, has learned to dance, and has joined a club at school which will give parties and dances. Another good vacation is to follow.

CASE 17.—A girl of 10, with an I.Q. of 116, complained of her heart, with abdominal pains radiating to the heart, and succeeded by indefinite pains anywhere. Physical examination showed the child to be in a wretched physical condition, very thin, stooped, and sallow, with dark circles under the eyes, head jerking, and muscle twitching. All tests were negative.

Situation.—The child is ten years younger than any of the adult siblings, but, with a mental age of 12 years, she is treated as if she were the same age as the 6-year-old sister, being sent to bed at 7:30 and never allowed to listen to adult conversation with numerous visitors. The favorite indoor sport of the teacher-sister and medical student-brother was to work her up into a blind rage by

baiting, teasing, and ridiculing her unmercifully, at which time she said she "longed to kill someone." When her heart was weak after influenza, the much dreaded scorn and baiting stopped, and even the adults took time to notice and talk to her. On the return to the hated regime, she brooded, couldn't eat or sleep, became constipated, and complained of abdominal pain. Again a pleasant respite, but it was soon lost. She had nightmares, became suspicious and apprehensive, bit her nails to the quick, was full of fears, couldn't concentrate on her school work, couldn't remember, and gave up physical education at school for fear of bringing on heart attacks.

The girl was convinced her body was sound and that she could participate in normal activities, and a wholesome regime was planned for her. Four months later the mother made the long trip to San Francisco to show how much better the child was and to report the hearty cooperation of the whole family, the teasing members being much mortified over the role they had played unthinkingly.

CASE 18.—A fine-looking boy of 9, with an I.Q. of 121, complained he had "rheumatic pains which paralyze my legs," choking spells, vomiting, and throat pains that "go to my ears, around the eyes and straight into the head" of two months' duration (since the opening of school). The physical examination was negative.

Situation.—The father worked at night; the mother was very lonely, and she had taken up ill-health as an avocation, turning to the boy for companionship as "they both like the finer things of life." His mother applied epsom salt compresses like hers for his rheumatic pains, and she also gave aspirin "whenever the pain is serious," he says. Two weeks ago, when he was told to go to school, his legs became too weak to hold him up, although when the suspicious father yanked him out of bed, he ran with agility until the mother arrived on the scene "like a tigress." An hour later he was climbing a telephone pole to see into the neighbor's yard. He reported, "My heart beats too slowly; I always put my hand over my heart in bed and wonder if it is going to stop and then I'd die and everybody would be sorry." School? "Why, I did 200 examples this morning; I often do a hundred at a time." (He has failed.) Strength? "I'm the strongest boy in the block. I can run the fastest and fight the best. I just give them a sock in the jaw." (He is regarded as a sissy.) Games? "I'm good in everything, especially basketball; I play halfback in it." His ambition in life is to be "real strong like a giant and knock 'em all cold."

The situation was discussed with the parents. The mother became convinced when the paralysis disappeared after the father partly carried him to get him to school. They cooperated very well in ceasing any talk of ill-health, and encouraged daily attendance at school and daily play after school in the playground. The father taught the boy skills in sports, and the family had more recreation together. An excellent outcome resulted.

CASE 19.—A boy of 13, with an I.Q. of 112, complained of dull heart pains for which he had to "lay down like Mother," vomiting spells, and fainting during spells. On physical examination, the child looked to be in poor condition and was hospitalized for gastrointestinal series, blood sugar determinations, x-ray of the sinuses, urinalysis, and blood study, all of which were negative.

Situation.—There had been much dissension between the parents since boy was little. The mother had definitely turned from the father and was making the boy the sole outlet for her emotions. Her eyes filled up repeatedly and her lips, even her chin, trembled as she talked about her fears over his health. She inquired anxiously several times a day how he was feeling and fussed over eating, sleeping, or anything else connected with health. She kept him so close to her that he has had nothing to do with children and now prefers to be with her at all times. He was full of fears, especially of dying. The boys called him scarecat, and he was withdrawing. The mother noticed that he almost always had an attack if he planned to go some place.

The parents cooperated in ceasing to talk of ill-health. The boy is more with other boys. His heart complaints are gone, but the vomiting spells continue, although with less severity and frequency, as the dissension of the parents still goes on.

CASE 20.—A "beautiful, but dumb," girl of 15, with an I.Q. of 79, first complained of severe pain in the right shoulder of one year's duration, supplanted by left upper quadrant pain, headaches, and pains here and there which came on,

it was noted, whenever there was housework, schoolwork, or sewing to be done. The physical examination was negative.

Situation.—She was failing in school, which brought forth scathing remarks from the hard-faced mother who doted on the smart little sister. The patient was overworked, one job being to scrub floors, bathtubs, etc., in the mother's cheap boarding house. One day she strained her right shoulder moving furniture and was not too dumb to realize the advantages of pain when her overwork ceased. The orthopedists were not hard-hearted, and each time her mother brought her in, they painted the shoulder generously with a brilliant dye. But the effect wore off, and more and more pains were adopted to try to get even with the rejecting, unjust mother who excused her pet but forced the patient to do the dirtiest work. She began to stutter, had nightmares, wet the bed, and fought with everyone. As treatment she was removed from the regular school and placed in the Lux School to prepare to earn her living. A job was then found for her, and there was no recurrence of pains, except on one day when she needed a headache because her employer had caught her lying.

CASE 21.—A thin, anxious Japanese girl, with a chronologic age of 14 years and a mental age of 10 years, came in, feeling that her "nose is spreading out," that she can't get her breath, can't eat, and feels itchy. Physical examination was negative, except for malnutrition and excessive nervousness.

Situation.—The father, who had died, was an Oxford graduate; the mother and adult siblings had graduated from high school and insisted on high standards. The menarche took place two months previously. The girl has entered high school and is having more and more difficulty with her schoolwork, staying up until 11 or 12 o'clock to finish it. She cannot remember what she learns. She is sent to Japanese language school directly after public school dismisses until 6 o'clock, and she is also taking piano lessons. The older sister reports that she finds the patient can pay attention now for only a few minutes, and becomes more and more restless until she bursts out with, "I can't stand it any longer." While the family does not punish her, they are anxious that she keep up the family standards and keep trying to make her do better. She is not allowed to play unless all work is finished. Her only recreation is to go to the park or beach once a week. In vacation she attends Japanese school longer and puts more time in on piano practice. She is now having crying spells, has become very sensitive and irritable, sleeps very restlessly, and is "afraid of everything," including the dark and sleeping alone. She gets halfway through her meals and says, "I can't finish it." The family cooperated in giving up the music, in having her go to bed by 9:30, and in having her take less work in high school. She did not stop Japanese school attendance, however, although the time was shortened to one and one-quarter hours. Four months later she was feeling much better.

CASE 22.—A shrinking boy of 12, with an I.Q. of 130, an albino with nystagmus, was sent in by the school as being "not in his right mind." The boy's complaints were pains in the muscles of his thighs, and "the doctor says something is wrong, I get faint and up and vomit and the pain is like a fog and lasts two to three days and I have to stay in bed." Physical examination showed extreme nervousness, tremor, head shaking, underweight, and malnutrition.

Situation.—The father, a shell-shocked veteran, had frequent spells of pain, going out of his head and lying unconscious as if dead. A heavy-drinking grandfather persecuted the patient, favoring a younger brother. Six months ago the small brother fell off a truck, was run over, and had to have both legs amputated at the thighs. As the boy was led to talk about his troubles, he said he still awakens "all sweaty," dreaming he is the driver of the truck, and he screams as he runs over his brother's legs. He also dreamed of the death of his father, mother, and self. In the dream he sees them lying "flat and stiff with staring eyes, and they go to Heaven and when they stand before God, their life marches before them and I—I wish I hadn't quarreled with brother before the accident." He cringed every time the accident was mentioned. "Lately I feel worried all the time." The school troubles began after the accident, about which the school was fully aware. The teacher reported that he couldn't be in his right mind, for he didn't pay attention any more, but jumped from his seat and wandered about the room. The principal reported that he was "just a psychopath and an exhibitionist, always wanting attention and talking about the brother's accident"; that he "enjoys poor health"; that he "is infantile and a pest."

The usual steps were taken to modify environmental factors; the school was contacted, and a long talk was had with the boy about his guilt feelings. Two months later he was much less worried and nervous, for the brother could now use the artificial legs. Four months later he was proud of an excellent report card from junior high school, with the notation, "Remarkable progress in attitude." He joined the Boy Scouts. At the close of the term he came in, no longer shrinking, but with head up, proud and self-possessed, reporting all aches and pains gone and that he was very happy now in junior high. He was sent to a summer camp to back the progress made.

CASE 23.—An attractive girl of 15, with an I.Q. of 98, complained of abdominal pain long after an appendectomy and dragged the right leg. She was in fair physical condition, but ate and slept poorly.

Home Situation.—There was much dissension. The bad-tempered stepfather was so oppressive that he would not allow the boys of 17 and 19 to talk at meals, even to mention football; he had his best suit "in hock" so he was unable to apply for a taxi-driving position. The boy of 19 objected to supporting him.

The girl entered the Children's Clinic with the complaint of headaches from loss of eyeglasses, but an interesting pain was found in the right lower quadrant and was followed zealously for five months, at which time the appendix was removed. Whenever an attack occurred at home, the fighting and dissension lessened, the mother treated her "swell," making her stay in bed and bringing in her meals, the boys petted and made over her, and she had time to read *True Stories, Sweethearts,* etc. On dismissal from the hospital, the surgeons gave no directions other than to do little exercising. The grandmother told her this was "to prevent her insides from falling out," and the mother forbade any dancing, gym, or basketball which she loved; she must sit quietly. Dissension was resumed, except when pain was faked and the right leg dragged. The girl's only hope of escape was to marry her 17-year-old boy friend or to go on the stage as an acrobatic dancer and tumbler. She had been trained for this since the age of 3, but had been stopped by the surgeons. The following measures were worked out: Get glasses (one year's delay); see surgeons for more definite instructions; family stop talking of illness; father go back to WPA in order to get suit out of hock; oldest boy go to NYA as typist; youngest boy go to CCC. These measures were carried out, and the girl improved and lost her complaints. One year later a notation in her chart, now that of Mrs. M., indicated she was attending prenatal clinic!

CASE 24.—A boy aged 13, with an I.Q. of 84, complained dejectedly, "I've got a stiff bone in my head," and "I can't feel my bowels moving around any more"; on examination he added headaches, dizziness, seeing double, and indefinite abdominal pains (without guarding). He was pale, stooped, very nervous, and malnourished.

Situation.—He had been the pet of the family for six years until he was ousted by a little sister, from which time he became devoted to an older sister who had died of tuberculosis four years previously. Shortly after, a school doctor took longer than usual in examining him and whispered about his lungs to the nurse. Greatly worried, he asked his mother if he had tuberculosis and what would happen to him. Not long after he developed all of his sister's symptoms of tuberculosis, this lasting in greater or lesser degree for over three years. He became very sensitive, cried easily, ate poorly, began avoiding other children, wet the bed, became very forgetful, and lay awake at night waiting to die. As part of the treatment, another physical examination was done for reassurement, the tuberculin test was shown to be negative, and the eyes were tested and found normal. The family was very cooperative in avoiding talk of ill-health and in attracting other boys into the home, getting him occupied with sports and joining a boys' club. He gained weight, was in good physical condition, and had no further physical complaints without organic basis in four years.

CASE 25.—A pleasant boy of 13, with an I.Q. of 113, complained of pain in his legs of one year's duration. The physical examination was negative.

Situation.—Discussion of the onset of pains disclosed that, a year before, the school doctor, after examining him, said to the physical education head, "His legs are no good." The boy's legs were fat and not those of a runner, which was probably the basis of the remark, but no explanations were given. As the boy puzzled over it, he noticed the legs "got numb on me" and his feet grew cold.

His grandmother made a small quilt to keep them warm. Pains developed which were helped by the mother's rubbing. When he ran, his legs would "fall out from under me." If he tried to play basketball or baseball at school, his legs would "give way" and he would have to stop. He became very sensitive, avoided other boys, slept restlessly, stuttered badly, took to telling tall tales of his athletic prowess, and increased his movie attendance of mysteries and horrors in which he apparently drowned his troubles.

To reassure him, the physician re-examined him physically and then called in another doctor to do the same, supplemented by other tests. The possible explanation as to origin was gone over, and a program was made out for socialization, participation in games, and substitution of other recreation to lessen movie attention. Stuttering was ignored. The patient joined the Boy Scouts. He was followed for one and one-half years, with steady improvement and no return of pains.

CASE 26.—A tall, serious boy of 12, with an I.Q. of 96, complained of heart trouble discovered by a school doctor. The physical examination was negative, except for a murmur thought to be functional; the electrocardiogram was normal. A reliable doctor who had been consulted during the alarm sent in his opinion—a functional murmur, with a normal electrocardiogram.

Situation.—In conversation the boy said, "I used to like to make things but, well—uh, you see, I got heart trouble and had to stop everything. I don't know whether it was three years ago, or one year or two years. Now I read in my spare time and after school I practice on the piano and walk about a little." "Sometimes I dream my mother is dying; she's—she's not in very good health; it's her stomach." "And I worry about earthquakes killing me since a radio announcer warned San Francisco residents to watch out for earthquakes in hot spells." "Now I listen a lot to the radio, especially the war news—it's awfully exciting—and I read all about it, too. I can't go to bed until I hear the 9 o'clock war news." Asked what he meant by his heart trouble, he said, "The school doctor said I had a heart murmur and said I'd better look out—I'd better take care of myself. And another doctor said I didn't have, and one said I did and I was scared to death and quit playing when the doctor said to. I got put into a health class and I got awful nervous there, my arm kept jerking and my eyes blinked and I pulled my fingers all the time like this." His wishes were "Good health for mother, grandmother and all I like, and I'd be strong and smart, too." His worries were: (1) "My health"; (2) "worry if I'll be a bum when I grow up, and have no work to do and not amount to anything like those in the pictures of the unemployed"; and (3) "Mother might get sick and die and grandmother die and what would become of me."

He was reassured, advised to resume handwork, told which mild activities to take up first, which next, and so on. At the end of a month he was eating well, sleeping from 8:30 P.M. to 7:35 A.M., was following the rest of the suggestions faithfully, even to eliminating all but the 7 o'clock war news, and had gained 6½ pounds. He was kept under close observation until he was back to a normal condition with his fears gone.

CASE 27.—A boy of 13, with an I.Q. of 99, came in with the complaint-problem of vomiting spells and tics of increasing severity for two years. Physical findings were negative, except for pallor, extreme nervousness, and malnutrition.

Situation.—He was an overprotected only child. The mother had hyperthyroidism; the father had a nervous breakdown; and the grandmother was very dominant. For the last three years he has been sent for summer vacations to visit an aunt who works in a movie theater. He attended shows all afternoon and evening for three months. At the end of the first summer, the tics began and the vomiting increased, but stopped after returning home and seeing a doctor. At the end of the second summer, they were back and worse, but disappeared at home under a chiropractor's treatments. At the end of the third summer, they were so bad that he was brought to San Francisco. He was in a pitiably nervous state, blinking, grimacing, jerking, twitching, and biting his nails. To add to the fears engendered by movie horrors of which he dreamed nightly, he has always listened to all the radio crime programs, read all lynching and kidnapping accounts in the newspapers, been told every time he left the house not to get into automobiles with men or accept candy as it might be poisoned to make him unconscious, and also warned several times a day of what terrible things can happen in traffic. He

pores over his own three dozen illustrated detective books (''big-little'') and trades with other boys for more. He wet the bed, became more fearful of the dark and dogs, was anxious and apprehensive, and kept to himself. As the above forms a common basis for overwhelming fears, with the exception of the greater concentration of movies in the summer, the usual advice was given to substitute other recreation for movies, to cut out radio crime programs, to provide wholesome reading, to stop talking of traffic accidents, kidnapping, and lynching, and to provide the setting for exercise and socialization in games and sports. A month later the father wrote in: ''His condition is much better. He is not near so nervous and he very seldom shakes his head any more. Everyone has noticed a wonderful improvement.''

NONSPECIFIC MESENTERIC LYMPHADENITIS

Report of Fifty-Eight Cases

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THE literature on mesenteric lymphadenitis has recently been so adequately reviewed in surgical journals[1, 2] that a repetition here is unnecessary. It is a condition which is not only of interest to the surgeon, but to the pediatrician, internist, and gastroenterologist as well. The following series is composed of thirty-seven consecutive cases from the private practice of one of us (DeW. S.) and twenty-one cases from the surgical wards and the Abraham Jacobi Division for Children of Lenox Hill Hospital. The final diagnosis has been confirmed in every instance by laparotomy and proved in 43 per cent of the cases by microscopic examination of one or more nodes removed at operation.

There were thirty-one males and twenty-seven females. The age distribution is shown in Table I.

Table I

AGE IN YEARS	NUMBER OF CASES
1– 5	7
5–10	21
10–15	17
15–20	8
20–30	4
32	1

Table II

MONTH	NUMBER OF CASES
January	6
February	2
March	7
April	3
May	5
June	10
July	2
August	3
September	1
October	5
November	8
December	6

Forty-eight patients were 15 years or younger.

The seasonal incidence is shown in Table II.

It is apparent that in this series no significant correlation can be made between the occurrence of mesenteric lymphadenitis and the season of

From the Surgical Service of Dr. DeWitt Stetten and the Abraham Jacobi Division for Children, Service of Dr. Jerome S. Leopold, Lenox Hill Hospital.

the year. This is all the more obvious in view of the fact that one of us (DeW. S.) was absent from the city throughout those summer months during which the fewest cases were found.

Thirty patients had had one or more attacks of definite abdominal pain previous to the one for which they were finally operated upon. Eleven had not had a previous attack of abdominal pain. In seventeen the occurrence or absence of former attacks of abdominal pain was not mentioned in the history. The prior attacks of abdominal pain were similar to the one for which laparotomy was finally performed. They were not infrequently accompanied by fever, or vomiting, or both.

All the patients had abdominal pain as a presenting symptom. The location is shown in Table III.

TABLE III

LOCATION OF PAIN	NUMBER OF CASES
Generalized	15
Umbilical	15
Right lower quadrant	15
Epigastric	5
Epigastric settling in right lower quadrant	5
Not determined	3

Since most of the patients were children, the exact nature or quality of the pain could not be determined accurately in enough cases to permit the drawing of significant conclusions. It may be stated, however, that in most instances the pain was not severe.

Twenty-four patients vomited, and, of these, thirteen vomited more than once. Thirty patients did not vomit. In four the occurrence or absence of emesis was not noted.

The highest preoperative temperature is shown in Table IV.

TABLE IV

TEMPERATURE	NUMBER OF CASES
Under 100°	30
100°–101°	7
101°–102°	10
102°–103°	10
104°	1

In fifty-four of the fifty-eight patients, definite abdominal tenderness was elicited. Forty-nine had right lower quadrant, four lower abdominal, and one generalized abdominal tenderness. In three instances the presence or absence of abdominal sensitiveness was not noted. In only one case was abdominal tenderness excluded.

Spasm or rigidity in the right iliac region was present in twenty-seven patients. It was usually not very marked.

In eight of the seventeen cases in which the results of a rectal examination were described, some tenderness was noted on the right. In the remaining nine cases the examination gave negative results.

The tonsils were present in fifteen patients. They had been removed in twenty-six. No mention of the tonsils was made in seventeen cases. There was congestion or hyperemia of the pharynx in ten patients. One patient had had the grippe five days prior to operation. Another had had acute tonsillitis and cervical adenitis four weeks before admission to the hospital. A previous or concomitant upper respiratory infection did not play a prominent role in this series.

Four patients had diarrhea either immediately before or during the attack for which operation was performed.

The blood counts were not remarkable. There were usually moderate leucocytosis and polynucleosis. Three patients had leucocyte counts above 25,000 per cubic millimeter: 27,000 leucocytes with 70 per cent polymorphonuclear cells; 27,800 leucocytes, with 88 per cent polymorphonuclear cells; and 39,600 leucocytes, with 95 per cent polymorphonuclear cells, of which 35 per cent were immature forms.

Preoperative barium roentgenograms were made of the entire gastrointestinal tract in three patients. All gave negative results. A simple roentgenogram of the abdomen was negative in a fourth patient.

Five patients were tested with the intracutaneous injection of old tuberculin in amounts ranging from 0.1 to 1 mg. All reacted negatively.

There was one death in this series, that of a boy aged 8½ years who died of bronchopneumonia three days after operation. A post-mortem examination was not performed. Every other patient made an uneventful convalescence.

OPERATIVE FINDINGS

An excess of free peritoneal fluid, in one instance estimated as high as several hundred cubic centimeters, was found in twenty-two patients. It was turbid, straw-colored or serosanguineous. In the five cases in which this fluid was cultured no growth was obtained.

In no instance was there a frank acute inflammation of the appendix. The organ was either grossly normal, thickened, or from slightly to moderately injected. In twenty-three of the fifty-eight cases there was evidence of previous infection, as shown by definite appendicular adhesions. The presence of this high incidence of adhesions of the appendix in such a young age group we believe to be of considerable significance.

The following were the pathologic diagnoses made after microscopic examination of the appendix: chronic productive appendicitis, chronic catarrhal appendicitis, lymphoid hyperplasia of appendix, chronic recurrent appendicitis, and, in only very few instances, acute and chronic catarrhal appendicitis.

At operation the condition of the mesenteric nodes was found to conform in every case to the classical, frequently described[1-4] picture of acute, nonsuppurative mesenteric lymphadenitis. The nodes were enlarged, as judged by Mead's[5] measurements, varying from approximately 0.5 to 3 cm. in diameter. They were pinkish-red, red, or violet,

congested, swollen, tense, and acutely inflamed. No instances of necrosis, suppuration, caseation, calcification, or perforation were observed in this series. Although present in the mesentery of all sections of the small intestine, the largest collections of inflamed nodes were usually found in the ileocecal region. In many cases hyperplastic and hyperemic mesenteric nodes were easily seen within a centimeter or two of the gut. Frequently, however, the nodes in close proximity to the intestine were not very large. In such cases further careful deep exploration would reveal a packet of inflamed nodes at the root of the mesentery.

The microscopic pathology of the lymph nodes was not as striking as one would have been led to believe from their gross appearance at operation. In the main, the sinusoids were markedly dilated with hyperplasia and often desquamation of the lining endothelial cells. The sinusoids were filled with increased numbers of lymphoid and endothelial cells. Frequently the lymph follicles were greatly increased in size, with hyperplasia of the germinal centers. The nodes showed evidences of edema, with coagulated serum within the interstices of the stroma. Congestion and hemorrhage were commonly found. In several instances there was a marked hyperplasia of the reticulum cells. In others there was some replacement of the lymphoid elements by bands of connective tissue, which in places had undergone hyalinization. Only rarely were there small areas of polymorphonuclear infiltration or necrosis. The capsule was frequently thickened, congested, and infiltrated with round cells. In general, throughout the series the element of hyperplasia was much more marked than that of inflammation. Cultures of the nodes were made in a number of cases and were invariably sterile, and staining of the tissue sections for bacteria was always negative.

OPERATIVE PROCEDURE

Appendectomy was performed in every case. Following this, a careful exploration of the abdomen was made. In twenty-five cases one or more mesenteric nodes were removed for examination. The abdomen was closed without drainage.

FOLLOW-UP STUDY

Twenty patients were examined at follow-up clinics from one month to six years and seven months after operation. Fifteen of these were seen three months or more after operation. Eleven of the twenty patients had had one or more attacks of abdominal pain similar in nature but not in severity to the one for which they had been operated upon. The attacks of pain were relatively mild, brief, and unaccompanied by fever or vomiting. They did not incapacitate the patient, nor were they of a severity sufficient to cause him to seek medical aid. It is our impression that they tend to abate and disappear during the course of the years. Of the nine patients who had no abdominal pain

after appendectomy, five had had attacks of pain previous to the one for which they underwent operation. In two of the nine no notes were made as to the occurrence or absence of previous attacks of pain. Of the eleven patients who did have abdominal pain after appendectomy, five had had attacks of pain previous to the one for which they underwent operation. In three cases no mention was made as to the previous occurrence or absence of abdominal pain.

DISCUSSION

Nonspecific mesenteric lymphadenitis is a recurrent syndrome found principally among the young.[6-8] The symptoms and signs so closely simulate those of appendicitis that the latter condition can rarely be excluded. While it is true that appendicitis can only infrequently be ruled out completely, in many instances the clinical picture is so characteristic that a strong preoperative suspicion of the diagnosis is possible. Although in our series we were never able to do so, it is conceivable that under certain very favorable conditions—large nodes, thin patient, and soft abdomen—the nodes could be palpated before operation. In this series abdominal pain and right lower quadrant tenderness were constant, with nausea, vomiting, fever, and spasm in the right iliac region frequent accompaniments. In the great majority of our cases the preoperative diagnosis was acute appendicitis. In none could it be definitely excluded. We have not had enough experience with Klein's sign[3] to form an authoritative opinion of its real value, but we would not forego laparotomy if the sign were positive and the clinical picture, on the other hand, that of acute appendicitis. A definite diagnosis of mesenteric lymphadenitis must at present be reserved for the operating table. We advise operation not merely for diagnosis, but also for appendectomy and its therapeutic benefits, as we share the rather general opinion that, in some way still not very well explained, the removal of the appendix favorably affects the course of the disease.

Numerous theories as to the etiology of mesenteric lymphadenitis have been advanced, many in considerable detail. None has been adequately proved. Upper respiratory,[6] tonsillar and appendiceal[4] infection, allergy, enteritis, poliomyelitis,[9] viruses,[7] absorption of infection or toxins from the ileocecal region,[3, 8] absorption of histamine-like substances from the gut,[2] bacterial sensitivity of the gastrointestinal tract[2]—each has its proponents and opponents as the cause of this syndrome. We do not believe that the fundamental etiology of mesenteric lymphadenitis can be obtained by a discussion of clinical reports.

Several investigators[9-11] have noticed a relationship between the occurrence of this disease and the season of the year. The cases are said to be most frequent in late winter and in midsummer. No seasonal incidence was observed in the present series.

Foster[2] has reported that 95 per cent of 115 cases of mesenteric lymphadenitis showed evidence of inflammation of the appendix at some time. However, in 87 per cent of his cases appendiceal involvement was diagnosed by microscopic examination. The presence of adhesions of the appendix would seem to be a more definite criterion of appendiceal involvement than microscopic alterations alone, since adhesions of this organ certainly indicate the occurrence of previous disease. In 40 per cent of our cases, adhesions of the appendix were noted at operation. In a group 83 per cent of which were 15 years of age or under, this incidence of adhesions of the appendix seems too high to be a fortuitous occurrence.

In the material from which our cases were taken there were, in addition, eight cases of tuberculous mesenteric lymphadenitis. These are not included in the present study. In none of the fifty-eight cases reported was there grossly any evidence of tuberculous infection of the mesenteric lymph nodes. Microscopic examination of the nodes which were removed at operation in 43 per cent of the cases likewise failed to show tuberculosis.

The impression is prevalent that biopsy of a mesenteric node is a procedure attended by some danger[2, 7] to the patient because of the possibility, not only of damaging the blood supply to the intestine, but also of initiating a streptococcus peritonitis. The removal of one or more lymph nodes in twenty-three of the cases in this series was performed carefully but rapidly and without technical difficulties. Every patient made an uneventful convalescence.

Mesenteric lymphadenitis is even more common than hitherto supposed; it is without doubt not infrequently overlooked at operations performed as a result of the unavoidably incorrect diagnosis of acute appendicitis. Little emphasis has been placed in the literature upon the fact that more acutely uninflamed appendices have been removed following the honest diagnosis of acute appendicitis than is perhaps realized. Especially in children and young adolescents, among whom appendicitis is as notoriously treacherous as its diagnosis is difficult, must this state of affairs at present necessarily remain if the mortality from appendiceal peritonitis is to be reduced. Sappington and Horneff[12] made a careful histologic examination of the appendices in 937 cases in which the clinical and operative diagnosis of appendicitis had been made. In 60 per cent of these cases the appendix was normal. Aschoff[13] found no evidence of appendicitis by microscopic examination in 35 per cent of 847 cases so diagnosed.

In one important respect our own experience does not coincide with the findings in these two studies. Almost without exception, our appendix cases, even when not acute, have shown definite pathologic changes on microscopic examination which can best be summarized

under the head of chronic appendicitis. Incidentally, in the vast majority of these cases, especially in children, even if not associated with mesenteric lymphadenitis, the patients were completely relieved of their previous symptoms, and their general condition seemed to be improved greatly by the operation. These facts, however, in no way minimize the importance of those cases which preoperatively present the symptoms and signs of acute appendicitis without revealing acute inflammation of the organ at operation. Since the appendix is not essentially at fault, what does cause a clinical picture which mimics acute appendicitis so closely that laparotomy is performed? In children, adolescents, and young adults the cause is not infrequently an overlooked mesenteric lymphadenitis. Definite though slight pathologic alterations in the appendix are generally found in this syndrome. The operating surgeon is tempted to regard these changes as the explanation for the clinical picture and to close the abdomen after appendectomy without further exploration. Since the majority of patients with mesenteric lymphadenitis are free from recurrent attacks of abdominal pain following appendectomy, this cure is used as a confirmation of the erroneous operative diagnosis. On the other hand, in those patients who do have attacks of pain following operation, little importance is attached to the complaint since the appendix has already been removed. In this manner the true diagnosis is never discovered. It has been our repeated experience at operations performed for the acute appendiceal syndrome by one of us (DeW. S.) to find an appendix which presented slight engorgement of the serosal vessels, thickening, or adhesions, none of which could account for the severity of the symptoms and signs. Further exploration would reveal a packet of inflamed nodes at the root of the mesentery. If, at an operation for acute appendicitis in a child or adolescent, the condition of the appendix does not fully and adequately explain the clinical picture, careful exploration for mesenteric lymphadenitis should be performed. Frequently the surgeon will be rewarded by finding a mass of inflamed nodes as the true cause of the symptoms and signs.

None of the articles on mesenteric lymphadenitis has individually contained enough follow-up material to permit the proper evaluation of appendectomy in preventing the recurrences of abdominal pain which are such an integral part of this syndrome. Correlation of the follow-up studies in Table V reveals that 71 per cent of 161 patients with mesenteric lymphadenitis were free from abdominal pain after appendectomy. This fact alone, however, does not permit us to gauge the therapeutic effectiveness of appendectomy for the following reason. Any single attack of nonsuppurative mesenteric lymphadenitis is almost always self-limited and will disappear under conservative treatment. We must, therefore, ask the following question: What percentage of patients seen during an attack of mesenteric lymphadenitis and treated

without operation would, after the conclusion of the attack, be free of abdominal pain in the future? Only by comparing this percentage with the 71 per cent of patients free of abdominal pain following appendectomy can we evaluate the therapeutic effectiveness of operation in this disease.

TABLE V

NO. OF PATIENTS IN FOLLOW-UP STUDY UPON WHOM APPENDECTOMY HAD BEEN PERFORMED BECAUSE OF MESENTERIC LYMPHADENITIS	NO. OF THESE PATIENTS FREE FROM ABDOMINAL PAIN AFTER OPERATION	AUTHORS
30	30	Brown[4]
8	7	Wise[7]
29	10	Rosenburg[10]
20	16	Ireland[1]
14	10	Ingegno[14]
40	33	Strömbeck[15]
20	9	Sobel and Stetten
161	115	

TABLE VI

NO. OF PATIENTS WITH MESENTERIC LYMPHADENITIS	NO. OF PATIENTS WITH ONE OR MORE ATTACKS OF ABDOMINAL PAIN PREVIOUS TO THE ONE FOR WHICH OPERATION WAS PERFORMED	AUTHORS
115	92	Foster[2]
30	15	Brown[4]
33	15	Strömbeck[15]
58	30	Sobel and Stetten
236	152	

Unfortunately, one cannot follow a series of patients with mesenteric lymphadenitis who had not undergone operation because without operation the diagnosis would always be in doubt. The problem must, therefore, be approached indirectly. Table VI reveals that 64 per cent of 236 patients with mesenteric lymphadenitis had attacks of abdominal pain previous to the one for which they were operated upon. It might be permissible to assume for the moment that a like percentage would have continued to suffer attacks of abdominal pain if appendectomy had been withheld instead of being performed, since, without operation, nothing would have been changed. It is true that some of the patients with previous attacks of pain were seen in what was destined to be their last attack, even without operation. It is equally true, however, that some of the patients who had never had a previous attack would have, without operation, gone on to future attacks of abdominal pain. These two sets of persons would tend to balance each other. On the basis of this assumption, then, roughly two-thirds of the patients with mesenteric lymphadenitis will be free of abdominal pain following appendectomy, as against only one-third treated without operation.

The assumption is not completely valid because it takes into consideration neither the average number of attacks of abdominal pain which a patient with mesenteric lymphadenitis will undergo, nor the number of attacks suffered by each patient in the series. It does, however, point the way to a simple, feasible method for more accurately determining the effect of operation in preventing the recurrence of attacks. Table VI indicates that approximately two-thirds of the patients with mesenteric lymphadenitis have at least two attacks of abdominal pain. It can be safely postulated, therefore, that two-thirds of the patients seen during their *first* attack of mesenteric lymphadenitis will go on to have at least one more attack of abdominal pain if they are denied operation. The method is simply to determine the percentage of patients with mesenteric lymphadenitis free of attacks of abdominal pain following an appendectomy performed during the *first* attack. Adequate follow-up data on this point are absent from the literature and present in insufficient amount in this series. If two-thirds of the patients operated upon during the *first* attack are free of future abdominal pain, as is the case in a routine series, the exact therapeutic benefit of operation will be definitely established. This is for the future to decide.

CONCLUSIONS

Fifty-eight proved cases of nonspecific mesenteric lymphadenitis are reported. All but five were under 20 years of age. In 43 per cent of the cases a biopsy of one or more lymph nodes was performed.

The dangers inherent in the removal of a mesenteric node have been exaggerated. Probatory excision of a mesenteric node is devoid of danger if carefully performed.

In 38 per cent of the cases an excess of free peritoneal fluid was found at operation.

Definite adhesions of the appendix were present in 40 per cent of the patients in this series.

Despite many ingenious theories, the etiology of mesenteric lymphadenitis remains unknown. There seems to be some relation to disease of the appendix.

If, at an operation for acute appendicitis in a child or adolescent, the condition of the appendix does not completely explain the clinical picture, a careful exploration for inflamed mesenteric nodes should be made, especially at the root of the mesentery.

At least two-thirds of the patients seen during their first attack of mesenteric lymphadenitis will have future attacks of abdominal pain if operation is withheld.

Less than one-third of the patients who undergo appendectomy for mesenteric lymphadenitis have attacks of abdominal pain in the future.

For obvious reasons, operative interference is indicated, even if there is a suspicion that the case is one of mesenteric lymphadenitis. In some way appendectomy seems to have a relation to the cure of this recurrent disease.

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1114 MADISON AVENUE

850 PARK AVENUE

TREATMENT OF CRYPTORCHIDISM WITH CHORIONIC GONADOTROPIC HORMONE AND MALE SEX HORMONE

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RECENTLY one of us (Zelson)[1] has reported on the treatment of cryptorchidism with gonadotropic hormone and showed descent to have occurred in 31 per cent of the cases. Some time later we reported[2] on the treatment of cryptorchidism with male sex hormone by which we were able to obtain complete descent of the testicles in 15 per cent and a partial effect in 45 per cent of the cases treated. A review of the literature has been included in these publications.

We are of the opinion that cryptorchidism, if there is no mechanical obstruction, is due either to a lack of gonadotropic hormone in the circulating blood or to some inherent abnormality in the undescended testicle which interferes with the production of male sex hormone in response to stimulation by the gonadotropic hormone; or there may be a combination of both factors. In the publications mentioned we reported some favorable results which followed injections of the gonadotropic hormone in one group of patients and of the male sex hormone in another group of patients. It was noted that some of our patients who had not responded to the gonadotropic hormone had, in turn, responded successfully to the male sex hormone. However, a number of our patients did not respond to the treatment with one of these hormones. In consideration of these facts, we felt that perhaps better results might follow the administration of the two hormones in combination. We are herewith presenting the results of such treatment in a series of boys with cryptorchidism.

CHOICE OF CASES

All the patients who were treated in this series were selected from the children's outpatient department of the Mount Sinai Hospital of New York. There were seventeen children, ranging in ages from 7½ to 12½ years. All the children had been seen previously at intervals for several months. Some of the cases had been followed for several years. Fifteen of the boys showed unilateral and two bilateral cryptorchidism, totaling nineteen undescended testicles. The testicle was palpable in the canal in all but three patients. Five of the boys were rather thin; eight were normal in size; two were small for their age; one was obese; and one was a Fröhlich type. All the patients satisfied the criteria given in a previous study.[1] Nine of the seventeen boys had been treated previously for cryptorchidism. Seven of the boys had re-

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TABLE I

CASE NO.	AGE	UNDESCENDED TESTICLE		GENERAL APPEARANCE	PREVIOUS TREATMENT	DRUG USED AND AMOUNT PER DOSE	LENGTH OF TREATMENT	DOSAGE		RESULTS ON CRYPTORCHIDISM	REMARKS
		SINGLE	BILATERAL					TESTOSTERONE (MG.)	PREGNYL (UNITS)		
1	11	Left in canal		Normal	None	500 units pregnyl plus 10 mg. test. prop. 3 times a week	2 mo.	200	10,000	Descent into scrotum	Scrotum larger and red; penis larger
2	10	Right in canal Small		Penis and scrotum small	10,500 units A.P.L. in 6 wk.; 250 mg. test. prop. in 1 mo.	500 units pregnyl plus 10 mg. test. prop. 3 times a week	3 wk.	90	4,500	Descent into scrotum	Both testes larger; penis larger; pubic hair
3	11	Right in canal		Thin	250 mg. test. prop.; 25 mg. 3 times week	500 units pregnyl plus 10 mg. test. prop. 3 times a week	9 wk.	200	10,000	No result	Small right-sided inguinal hernia
4	12	Right in abdomen		Normal	None	500 units pregnyl plus 10 mg. test. prop. 3 times a week	12 wk.	200	10,000	No result	Penis larger; pubic hair
5	10		Both in canal	Small for age	9,550 units follutein at 7 yr.; 11,000 units pregnyl at 9 yr.; 250 mg. test. prop. at 9½ yr.	500 units pregnyl plus 10 mg. test. prop. 3 times a week for 5 wk., 2 times a week for 7 wk.	12 wk.	270	14,500	Both in scrotum	Left inguinal hernia; penis larger; pubic hair

6	12	Right in canal		Thin and tall	275 mg. test. prop.	500 units pregnyl plus 10 mg. test. prop. 3 times week	5 wk.	140	7,000	Both in scrotum	Has grown 3¾″ in past 7 mo.; testes smaller; some pubic hair
7	10	Left in canal		Thin; penis small	None	500 units pregnyl plus 10 mg. test. prop. 3 times week	6 wk.	180	9,000	Both in scrotum	Gained 6 pounds
8	7½	Left in canal		Thin; penis small	10,000 units A.P.L. 2 mo.; test. prop. 125 mg. at 7 yr.	500 units pregnyl plus 10 mg. test. prop. 3 times week.	9 wk.	110	5,500	No change	Penis larger
9	12		Both small in canal	Small for age	7,750 units follutein at 8 yr.; 160 mg. test. prop. at 11 yr.	500 units pregnyl plus 10 mg. test. prop. 3 times week	5 wk.	130	6,500	No change	Penis larger; hernia on right side
10	11	Right in canal		Normal	10,300 units follutein at 10 yr.; 75 mg. test. prop. at 10½ yr.	500 units pregnyl plus 10 mg. test. prop. 3 times week	4 wk.	110	6,000	Descent into scrotum	
11	12½	Right small in canal		Thin; penis and scrotum small	None	500 units pregnyl plus 10 mg. test. prop. 3 times week	5 wk.	150	7,500	Descent into scrotum; small testicle	2,000 units pregnyl given alone to enlarge testicle

TABLE I—CONT'D

CASE NO.	AGE	UNDESCENDED TESTICLE		GENERAL APPEARANCE	PREVIOUS TREATMENT	DRUG USED AND AMOUNT PER DOSE	LENGTH OF TREATMENT	DOSAGE		RESULTS ON CRYPTORCHIDISM	REMARKS
		SINGLE	BILATERAL					TESTOSTERONE (MG.)	PREGNYL (UNITS)		
12	10	Right small in canal		Normal	5,100 units A.P.L. at 8½ yr.; 10,000 units A.P.L. at 9½ yr.; 200 mg. test. prop. at 9¾ yr.	500 units pregnyl plus 10 mg. test. prop. 3 times week	8 wk.	250	12,500	No descent	Penis larger; pubic hair; right testicle smaller and can be pushed into scrotum
13	12½	Left small in canal		Normal	10,000 units follutein at 11 yr.; 120 mg. test. prop. at 12 yr.	500 units pregnyl plus 10 mg. test. prop. 3 times week	5 wk.	150	7,500	No change	Penis larger; pubic hair; testicle smaller
14	7½	Right in canal		Normal	None	500 units pregnyl plus 5 mg. test. prop. 3 times week	6 wk.	85	7,700	No change	Scrotum larger
15	8	Right in abdomen		Obese	None	500 units pregnyl plus 5 mg. test. prop. 3 times week	5 wk.	70	5,600	Descent into scrotum	Penis and scrotum larger
16	9	Right in abdomen		Fröhlich type	None	500 units pregnyl plus 5 mg. test. prop. 3 times week	3 wk.	40	4,000	Descent into scrotum	Penis and scrotum larger; pubic hair
17	11	Left in canal		Normal	None	500 units pregnyl plus 5 mg. test. prop. 3 times week	6 wk.	110	8,900	No change	Penis and scrotum larger; pubic hair

ceived one or two series of injections of gonadotropic hormone and, in addition, a series of injections of testosterone propionate. Two of the children had been given testosterone propionate only.

TREATMENT

The treatment consisted of intramuscular injection of a combination of chorionic gonadotropic hormone and male sex hormone three times a week. The chorionic gonadotropin* which we used had a potency of 500 R. U. per cubic centimeter. The testosterone propionate† used had a content of 10 mg. per cubic centimeter.

Four boys received intramuscular injections of 500 units of gonadotropic hormone and, at the same time, 5 mg. of testosterone propionate three times a week. Thirteen boys received intramuscular injections of 500 units of gonadotropic hormone and 10 mg. of testosterone propionate three times a week. Treatment extended over a period of from three to twelve weeks. The total dosage of testosterone propionate given ranged between 40 and 270 mg.; the total dosage of gonadotropic hormone given ranged between 4,000 and 14,500 units. The great difference in the total dosage depended, in some cases, upon whether or not the child returned for treatment as often as required; in others, the treatment was discontinued when a cure of the cryptorchidism became evident.

RESULTS

Of the seventeen boys who were given this course of treatment, nine had been previously treated without satisfactory results; eight of the boys had not been treated before. Complete descent occurred in nine (53 per cent) of the seventeen children treated. There was no effect upon the cryptorchidism in the other eight children. Of the group previously given treatment without success, four (44 per cent) of the nine cases responded with descent of the testicles into the scrotum. Five of the children that responded to treatment had not been treated previously. In all patients but three, the penis and scrotum became larger. Growth of pubic hair occurred in eight of the seventeen children. In three of the children an inguinal hernia became evident. The undescended testicle became smaller in three. In one bilateral case both testicles descended and grew larger.

DISCUSSION

Because of the possibility of a spontaneous descent of undescended testicles at or near puberty, many clinicians prefer to postpone treatment until the twelfth or thirteenth year. We believe that, for a normally functioning testicle, descent should occur before puberty. Too

*The chorionic gonadotropic hormone used was pregnyl (Roche-Organon). Pregnyl is supplied as a dry powder which is dissolved in distilled water just prior to the time of injection.

†The male sex hormone used was the synthetic testosterone propionate manufactured by the Roche-Organon Co. under the trade name of neo-hombreol.

long a delay in the descent may prevent the normal development of the testicle. Consequently, we feel that treatment should be started two or three years before expected puberty, especially in those cases of cryptorchidism which satisfy the criteria set by us. We expect that in similar groups of cases a greater percentage of success will be obtained in the group in which treatment is started earlier.

For the normal descent of the testicles there must be present both a sufficient amount of gonadotropic hormone in the blood stream and a normally functioning testicle for the production of male sex hormone. If there is no mechanical obstruction, cryptorchidism, in our opinion, is the result of an inadequacy of one or both of these factors. If the testicular underfunction is slight, the gonadotropic hormone supplied may suffice to influence the descent directly and to stimulate the testicular secretion. If, however, the testicular underfunction is pronounced, an additional supply of testicular hormone will be needed to produce descent. If the latter hormone alone is deficient, its artificial supply will be sufficient to bring about the desired effect.

In harmony with this conception, many of our cases responded to the chorionic gonadotropic hormone alone, some to male sex hormone alone, and still others to neither when given successively.

In our present series, with the combined treatment, we succeeded in producing descent of the testicles in one of two cases previously treated with male sex hormone alone, and in three of seven that previously had been given both hormones separately. Thus, four (44 per cent) of nine patients previously treated without success responded to this type of treatment. Eight other boys had had no previous treatment. Of this group, five (62.5 per cent) responded to the combined treatment. We were thus successful in 53 per cent of our cases. From our results it would appear that combined treatment is more effective than separate treatment with either hormone alone or successive treatment with both.

Care must be taken with this type of treatment since an excess of male sex hormone will cause sexual overstimulation and development. We know that pubic hair will grow in many of these boys during treatment, that the penis and scrotum will increase in size, and that frequent erections will occur. However, our observations up to this time seem to indicate that the dosage which we have found sufficient (5 or 10 mg. three times a week) is comparatively free of markedly distressing or undesirable effects. Consequently, we feel that 5 or 10 mg. of testosterone propionate at a dose is sufficient, and that the course of treatment over a six- to eight-week period is not harmful. Frequently the parents will remark that the boy "acts more like a boy now"; appetite improves, and there is a gain in weight during the period of treatment. Seven boys whom we treated with 25 mg. of testosterone propionate three times a week for from three to four weeks showed no better clinical effects than those receiving the dosage we recommend.

Frequent erections were the prominent feature of the more massive dosage. Chorionic gonadotropic hormone seems to be comparatively harmless in the dosage we recommend and use.

The question as to whether or not it is of value to attempt to reduce a unilateral undescended testicle has been a moot question in our minds. Schick[3] has frequently remarked that, if no obstruction is present, the undescended testicle is probably an abnormal one not to have responded to the circulating hormone as the other testicle had. Because of the possibility of other harmful effects occurring from the injections of these hormones, he feels that the routine treatment of unilateral cryptorchidism should not be carried out unless insisted upon by the family. Bilateral cryptorchidism is undoubtedly due to an inadequate supply of the necessary hormones and should be treated routinely.

SUMMARY

Seventeen boys with cryptorchidism, two of the cases bilateral, received a course of combined treatment with injections of chorionic gonadotropic hormone (pregnyl) and testosterone propionate (neo-hombreol). Each injection consisted of 500 R. U. of gonadotropic hormone with 5 or 10 mg. testosterone propionate.

Nine (53 per cent) of the boys responded with complete descent of the testes. These included four of nine boys who had been treated with either hormone alone or successively without any effect, and five of eight boys who had not been treated previously.

From these results it would appear that combined treatment is most effective.

In consideration of the expense, and in order to avoid any unnecessary premature sexual stimulation, we feel that the procedure in handling such cases should be as follows: First, a course of treatment with chorionic gonadotropic hormone, from 300 to 500 R. U. three times a week up to a total of 10,000 units should be given. If no response results, a combined course of treatment should then be given after a rest period of from one to three months. If no satisfactory result is obtained, the cryptorchidism should be treated surgically.

Treatment should be instituted before the boys are 10 years of age, preferably between 8 and 10 years.

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A STATISTICAL STUDY OF OTITIS MEDIA IN CHILDREN

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NINE years ago Brennemann[1] wrote an essay on otitis media which may well guide every pediatrician and general practitioner in the care of this disease. As is ever the case when the field of another specialty is intruded upon, I feel the need for an apology; and for this purpose, I quote the first paragraph from Brennemann's classic:

> "Why should a pediatrician, who is a general practitioner to the young, presume to discuss a subject that might seem to belong to a regional specialist? The answer is evident. In the first place, it is because he is a general practitioner and must therefore be usefully informed on one of the most common and most important diseases of childhood. Furthermore, he and the general practitioner alone are in a strategic position to acquire extensive and practical knowledge of the developmental period of middle ear disease and a resulting ability to prognosticate with some assurance in an early questionable case. The otologist commonly sees only the ear in the case presented to him for surgical judgment or treatment. The pediatrician, as a rule, sees the patient for the underlying throat infection before the ear is involved. If he is a good pediatrician he has long ago found his otoscope as indispensable as his stethoscope and in some cases even more so. By examining all ears in as routine a fashion as he does the chest, he becomes familiar with the normal and with the abnormal through all the stages from the simple redness and congestion, which accompany nearly all nasopharyngeal infections, to the bulging ear that cries for surgical relief. Finally, he is in a position that the otologist cannot occupy—that of being able to size up the whole clinical setting, of which the otitis may be only a very minor part."

During the years succeeding the publication of that article, I have tried to follow the precepts he outlined, and, in order better to evaluate the results obtained by following such a course, I have recorded the details of every case of otitis media that I cared for. In this report, those cases seen outside my private practice have been excluded, partly because I could not follow them properly from onset to recovery, but chiefly because the judgment of others too often complicated the picture.

I have observed repeatedly the truth of the belief that the pediatrician tends toward conservatism, the otologist toward more radical measures. Unfortunately, the pediatrician has defended his stand on clinical impression alone.

In the past eight years I have seen only one valid statistical study of otitis media in the very young, that of Bakwin and Jacobziner[2] from the infant service at Bellevue Hospital. To my knowledge, there has been published no recent statistical study of otitis media in children in outside practice as distinguished from institutional care. The figures that are presented in this study may justify the more conservative treatment of otitis media in children.

During the seven years that these records have been kept, 588 children with acute otitis media were seen in private practice. Excluded from this study are those in whom otalgia without obvious middle ear infection has been present, and those infants who, during routine examination, were found to have had asymptomatic otorrhea which had subsided spontaneously when observed. For less important factors in this study, 153 cases chosen alphabetically have been more minutely analyzed.

In any case study certain salient features should be emphasized—particularly the fatality rate, severe complications, subsequent functional result, and the economic loss to the individual.

Regarding function, I am unable to give figures, but my impression has been that the children, in general, have retained normal auditory acuity. To my knowledge, no child in this series retains a patent tympanic opening.

The study is also lacking in case fatality, although one child, whom I have not included in this series, was removed to a metropolitan hospital where mastoidectomy was done, and this child later died of pneumonia. In this case, however, one ear was discharging when the patient was first seen and a second ear was treated by myringotomy, and it is impossible to say to which category one should ascribe the result. The other criteria I have tried to portray graphically in the tables and charts here included.

In Table I is shown the illness during the course of which otitis media occurred. Although it is usually accepted that otitis media occurs most frequently during the course of acute coryza, in this series most ear infection has occurred quite unexpectedly in previously well children. It is well to bear in mind, however, that acute coryza is a difficult disease to estimate in the very young and that many cases may be overlooked in the presence of a more acute infection.

In Table II I have analyzed the relatively few cases of otitis media in children who required mastoidectomy before they recovered from their ear infection. From the point of view of the protagonist of con-

TABLE I

ANALYSIS OF PRECEDING ILLNESS IN 151 CASES OF OTITIS MEDIA

	CASES
No preceding illness	107
Coryza	15
Pharyngitis	6
Tonsillitis, grippe, and pneumonia	3 each
Scarlet fever, measles, and bronchitis	2 each
Miscellaneous factors	8

TABLE II

Total 588	Subsided 297 = 50.4%	→	0	Mastoidectomies 16*
	Myringotomies 199 = 33.8%	→	13 (81%)	
	Discharged spontaneously 92† = 15.8%	→	2 (12.5%)	

*In one case the cortex perforated without other warning.
†Sixty were draining when first seen.

servative care, the figures, though too few in number to have any statistical weight, are most encouraging.

In Tables III and IV are seen the mean number of visits paid the patient and the mean number of days of illness, respectively. Mean figures were used instead of averages to avoid the inevitable distortion from the relatively few cases in either category that required prolonged care. However, a fair idea of the distribution of these cases may be obtained from Charts 1 and 2.

TABLE III

MEAN NUMBER OF VISITS PAID CHILDREN WITH OTITIS MEDIA

Those subsiding without interference	2
Those discharging spontaneously	3
Those subjected to myringotomy	4

TABLE IV

MEAN NUMBER OF DAYS OF ILLNESS IN CHILDREN WITH OTITIS MEDIA

Those subsiding without interference	2
Those discharging spontaneously	8
Those subjected to myringotomy	6

Traditionally, scarlet fever and pneumonia are frequently complicated by ear infection. In each of these diseases, especially in scarlet fever, this ear infection has been a matter of dread, and supposedly more likely to result in severe complications than simple otitis media occurring during the course of colds and the like. My own experience has caused me to lose some of my fear of ear complications during these two diseases, and I should not hesitate to be as slow in opening a tympanum during scarlatinal ear infection as any other.

In pneumonia we are likely to find a picture unlike that found in other conditions. Usually there is a relative lack of pain and a surprising absence of tympanitis. In cases that I have observed daily through

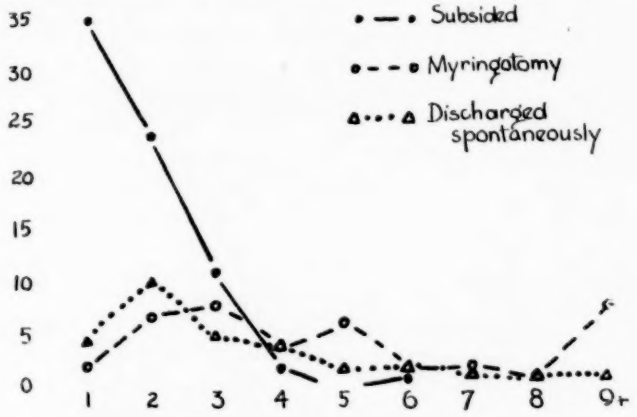

Chart 1.—Number of visits paid children with otitis media.

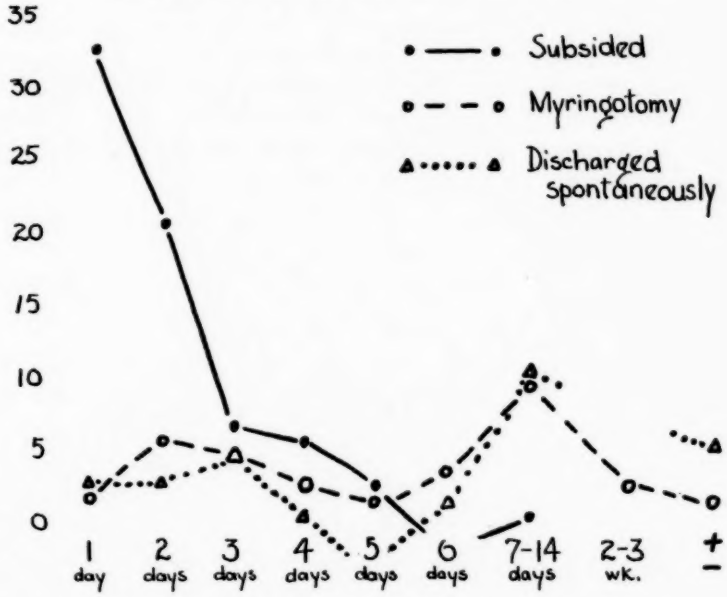

Chart 2.—Duration of illness in children with otitis media.

the course of this illness, the first sign of aural infection has usually been a bright yellow tympanum, apparently thickened, with considerable obliteration of the usual landmarks. If opened, these ears exude creamy

pus and they are loath to stop draining. If left alone, they cause little discomfort and subside relatively coincidentally with the pneumonic infection itself. I believe that they, above all, should be left alone.

In Tables V and VI I have outlined my experience in the case of these two conditions.

TABLE V

OTITIS MEDIA SECONDARY TO LOBAR PNEUMONIA

Pneumonia: 54 cases
Otitis media: 11 cases (7 bilateral)
{Myringotomy: 7 cases
{Subsided spontaneously: 4 cases
No mastoidectomy required in either group

TABLE VI

OTITIS MEDIA SECONDARY TO SCARLET FEVER

Scarlet fever: 68 cases
Otitis media: 10 cases (2 bilateral)
{Myringotomy: 4 cases
{Spontaneous discharge: 4 cases
Subsided: 2 cases
No mastoidectomy required in either group

In Chart 3 I have graphed the age incidence of otitis media, contrasting it with the age incidence of pneumonia and scarlet fever as seen in my practice. This illness is much more common in babies than either of the other infections, and there is less tendency toward an increase in frequency at kindergarten age than is found with scarlet fever and the more common infections of childhood.

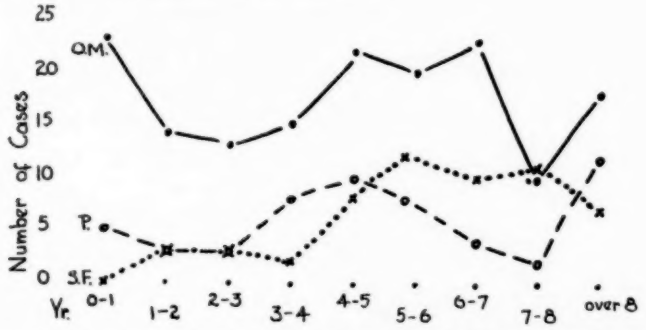

Chart 3.—Age incidence of otitis media (*O. M.*), based upon an analysis of a total of 588 cases (153 graphed). The curves for pneumonia (*P.*) and scarlet fever (*S. F.*) are included for comparison.

Every physician caring for children appreciates the frequency of otitis media as a cause of childhood morbidity. In this series I have found that, roughly, ten times as many cases of otitis media have been seen as of pneumonia or scarlet fever. In Chart 4 is shown the tremen-

dous seasonal variation of ear infection. A plateau may be observed extending throughout the cold months from October through April. The estival morbidity is practically nil.

During part of the year 1932, the writer, with the cooperation of Dr. Romola Lyons of Englewood, N. J., attempted a bacteriologic study of the aural discharge following myringotomy. The number of cases so studied is not adequate for statistical study, but we received the impression that the pneumococcus was the chief primary factor in the etiology of otitis media. (No typing was done.) A fair number of cases, however, showed nonpathogens in the cultures.

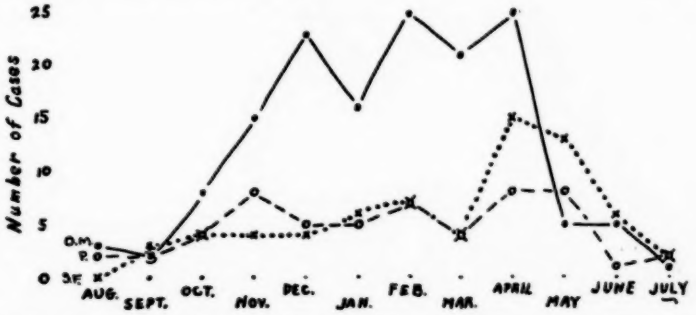

Chart 4.—Seasonal incidence of otitis media (*O. M.*), based upon an analysis of 153 of a total of 588 cases cared for between Oct. 1, 1931, and Oct. 1, 1938. The curves for pneumonia (*P.*) and scarlet fever (*S. F.*) are included for comparison.

It was also noted that mixed flora were found in many cases two or three days following onset of drainage, although a smear made at the time of myringotomy usually showed only one organism.

In our small number of cases it was impossible to correlate the severity of the illness with the type of organism discovered.

PRINCIPLES OF EXAMINATION

I mention my routine in examining the ear of a struggling child because I have not seen it described elsewhere.

Sheet restraint is more terrifying to the average small child than manual holding by the mother or nurse. On an unpadded table one cannot hold the head firmly; a bathinette is too wobbly and presents a back-breaking height at which to work. It is most satisfactory to have the baby supine on a bed, the examiner sitting *above* his head, the nurse holding his elbows (*not* hands) in such a way as to prevent motion or flexion of the forearms. She should sit at the level of the child's knees, leaning snugly upon his thighs just above the patellae. When so held the child can move nothing but his head, and this should be touched by no one except the examiner. When using the *small* handled electric otoscope, the head can be held far better by the observer than by an assistant.

One learns by experience to anticipate the motion of the child; one can never anticipate the motion of a casual assistant. When this routine of examination is employed, an inexperienced person can cooperate well in giving the required aid.

Most authorities seem to regard syringing the ear as the best and safest method of obtaining a clear field of vision. I can imagine nothing more painful during acute otalgia. My preference is the use of a tiny *blunt* ring curette used as delicately as possible, and it is rare that an articulate child will complain of pain during its employment. This may be complemented by the use of a small cotton swab. When myringotomy is indicated, I see no way to insure a truly sterile field. The instrument itself may be cared for satisfactorily by immersing in pure phenol and rinsing in 95 per cent alcohol.

Because of the danger, however remote, of anesthesia in babies, I prefer to use no anesthesia when myringotomy is needed in children under the age of 3 years. In older children, I have found vinethene the anesthetic of choice. It is pleasant, quick-acting, even when dropped upon the mask very slowly while the child counts, lasts for about a minute once the child is unconscious, has no period of struggling associated with induction of anesthesia, and allows recovery without nausea, nor is there undue salivation during induction or afterward.

THERAPEUTIC PRINCIPLES

It is difficult to adhere to any one plan of action in the treatment of otitis media in general. Each case must be treated as a separate problem, and it would be unfair to many patients to adhere too closely to a single routine.

In guiding us in the care of any patient, we may consider a few important facts. First, let us not be guided by traditional half-truths:

Does delayed myringotomy increase the incidence of mastoidectomy? I believe that it does not.

Is an ear which has discharged spontaneously necessarily slower in subsiding or more liable to surgical and functional complications than one whose discharge has been anticipated by myringotomy? From my experience, I do not believe that this is true, but I do not argue that spontaneous drainage is preferable.

Is it true that the use of phenol in glycerin drops so obscure the tympanic landmarks that further observation is made difficult? In my experience the use of phenol in glycerin drops has caused no more than a change in the color of the drum, with accompanying loss of light reflex.

Is it true that early myringotomy promotes immediate resolution of an inflamed middle ear? This opinion seems to be widespread among both the laity and physicians, but I believe that, if these same ears in which myringotomy was followed by dramatic cure had been left alone from the start, recovery would have been as prompt. I have no way to

prove that myringotomy is ever a factor in prolonging the course of an acute otitis media, but I have suspected it often. On more than one occasion I have felt strongly that mastoidectomy has become necessary in cases which had, from their history, an excellent chance of subsiding spontaneously had they never been subjected to myringotomy.

In many slight ear infections caused by relatively nonvirulent organisms, it is quite conceivable that the introduction of new organisms through the medium of myringotomy may increase, rather than lessen, the severity of the illness. My routine is to observe an acute ear for at least twelve hours, during which time the mother is instructed to fill the ear canal with analgesic drops (phenol, 2 c.c., in 30 c.c. glycerin), allowing the drops to soak in for at least ten minutes, the child remaining recumbent during that period with the affected ear upward. This treatment may be repeated every six hours if necessary. Coincidentally, nose drops (1 per cent ephedrine in normal saline) should be used, with the patient's head held to the side in a lowered position. In addition, aspirin, codein, or phenobarbital may be given. Local heat is usually acceptable to the older child. Babies usually resent its use, and it is not important to force its use.

The mother is asked to report the child's condition at the end of twelve hours. If the child still has extreme pain, or is toxic, myringotomy may be done if, on inspection, the drum is found to be more engorged than at the previous examination; but if the drum looks better, and the child does not seem acutely ill, a continuation of the previous therapy is indicated.

Assuming that myringotomy has been performed or that the ear has ruptured spontaneously, I do not favor irrigation as a routine procedure. But if the ear, whether draining freely or poorly, causes extreme discomfort, reasonably warm irrigations with saturated boric acid solution often reduce the pain and are accepted gratefully by even the smaller patients. In these cases the pain is not due to pressure but to the inflammation of the walls of the middle ear and antrum.

If the ear, although it has been well incised, ceases to drain after a short time and if some sign of fullness of the tympanum is noted, repeated myringotomy may often be avoided by warm irrigations, best preceded by instillation of pure hydrogen peroxide. The effervescence of this substance, on contact with the inspissated matter that may be assumed to obstruct the tympanic opening, often serves to remove this obstruction and drainage is re-established. When irrigation is used, the mother should be warned against undue pressure. Whether bulb irrigation or douching is employed is a matter of choice.

In this series of cases sulfanilamide was not employed because it was not in general use at the time. Even at present I employ it very sparingly, chiefly because I feel that it is unnecessary in the majority of cases and because I dislike exposing the child to the remotest possibility

of harm through the use of this drug. In occasional cases in which, despite adequate drainage, the temperature remains elevated and the child is toxic, I am inclined to use neoprontosil rather than sulfanilamide. The initial dosage may be rather large, aggregating 1½ grains per pound of body weight during the first twenty-four hours. I am inclined to discontinue the drug quickly when defervescence of the fever is established. If no effect is observed in forty-eight hours, it is discontinued.

I have not stressed bacteriologic study in association with this drug. I realize it is important, but the economic factor, an important one in private practice, and the time element are such as to make this type of control difficult.

I have consistently avoided the use of other members of the sulfamide group, although I am sure that their more general use may become more advisable as our knowledge progresses.

Before closing our argument in favor of conservative care of otitis media as opposed to less restricted myringotomy, we must consider briefly the psychologic factor. In discussing a paper on the care of the more common illnesses of childhood, one of my colleagues remarked that it was all very well to realize that a great many children would get by as well, or better, were operative procedures avoided, but that, when things turned out badly, had a consultant not been summoned, the onus of blame was one that could not easily be avoided. His implication was that the consultant, if summoned, was more prone to use surgical measures, partly because of his innate predilection toward operative maneuvers, and partly because he too realized that the parents would be more impressed by operative procedure than by reassurance and the employment of conservative measures. I believe, however, that if the general practitioner or pediatrician who desired to share his responsibility would explain carefully to the parent and later to the consultant, in their presence, that the otologist was being asked to judge regarding the necessity of operative procedure, conservative treatment would become more frequent.

SUMMARY

A statistical study of otitis media, based upon 588 cases seen in private practice over a period of seven years, has been presented.

It is felt that evaluation of the results, according to the length of illness and the infrequent necessity of mastoidectomy, has justified the use of conservative measures in the treatment of acute otitis media in children.

The conservative treatment of otitis media has been reviewed.

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2. Bakwin, H., and Jacobziner, H.: J. PEDIAT. **14**: 730, 1939.

BUILD VARIATIONS IN ADOLESCENT GIRLS

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VARIETY is not only the spice of life. It is one of its constant features. The variations of the human body have given foundation to at least one science, that of physical anthropology. Although physicians have been less successful than anthropologists in assigning significance to differences in body form, their attempts have been sufficiently rewarding to encourage continued effort.

Commonest formulation of the problem has been to seek contrasts between groups of patients bearing definite disease diagnoses. In a recent study of feminine build in relation to menstrual disorders and obesity, four distinguishable types were empirically sorted out.[1] They have been called hypofeminine, feminine, hyperfeminine, and virile (Fig. 1). Incidentally, classic myth and classic art have symbolized them all. In order to make them more vivid, one may associate long-limbed Diana with our hypofeminine build, ideal Venus with our normal feminine, Helene of Rubens with our hyperfeminine, and the masculine Amazons with our virile.

Reversing the approach, the present paper is concerned with the question of whether the morphologic variations occurring in an essentially normal group are such as to permit identification of these same types. Such types represent a constellation of physical characters occurring with sufficient frequency to make them clinically recognizable. As with other clinical syndromes, the elements which enter into them are subject to continuous gradations, so that the fully developed complex occurs only rarely. Nevertheless, the description of such types is helpful to any critical observation of the human form, just as the delineation of fullblown disease pictures helps in the understanding of minor illnesses.

The present classification is based upon a selected set of physical characters which are thought to reflect extent and direction of sexual differentiation. It assumes a basic relation between skeletal proportions, distribution of body hair, and those contours of the body which are determined especially by the development of the breasts, by the deposits of fat, and by the degree of muscularity. Since these are all prime factors in the sexual differentiation of the adult human form, it is reasonable to expect that within a normal sample of either sex there will be individuals who can be identified as consistent examples of

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under- or overdevelopment, or of heterosexual development. But biologic causation is so complex that it is also reasonable to assume that many individuals will show a grouping of characters which allows no such assignment of type, and so must be classified in the present scheme as atypical or mixed builds.

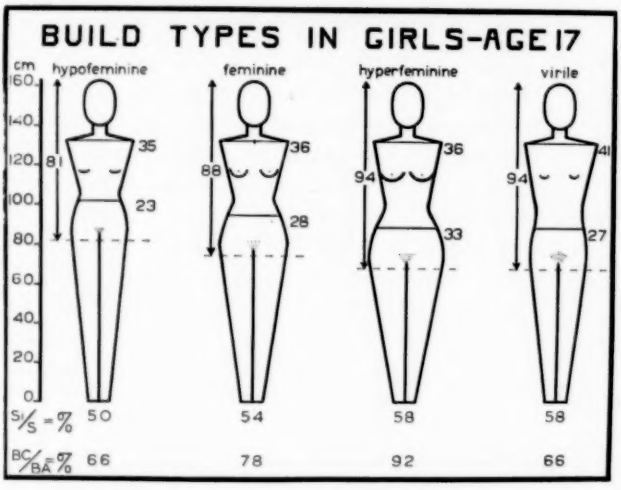

Fig. 1.—Build types in adolescent girls.

For convenience, the following description of the classification is quoted, with slight changes. It is based upon the following characters:

1. Breast development.

2. Hair distribution on trunk.

3. Sitting height stature index (sitting height divided by stature = Si/S). This ratio is an accepted means of determining long- or short-leggedness. Relative long-leggedness is often taken as anthropometric evidence of delayed maturation, because it may reflect a delay in epiphyseal closure.

4. Trunk breadth index (bicristal pelvic breadth divided by biacromial or shoulder breadth = BC/BA). This ratio has occasionally been used as an index for distinguishing typically feminine from typically masculine human forms. In combination with the Si/S it seems very effective for this purpose.

The four groups may be defined with regard to their essential features.

1. *Normal Feminine.*—Breasts well developed, body hair normally distributed, both indices within a percentage range of one standard deviation or sigma (σ) from the average. (Venus)

2. *Hypofeminine.*—Breasts small, hair sparse, both indices small, i.e., long legs and narrow pelvis. The sitting height stature index is smaller than one sigma below the mean and the trunk breadth index less than the mean. (Diana)

3. *Hyperfeminine.*—Breasts large, hair dense and sometimes excessive, one or both indices large i.e., short legs and broad pelvis. One or both of the indices is larger than one sigma above the mean; neither is smaller than one sigma below the mean. (Rubens)

4. *Virile.*—Breasts small, hair excessive, sitting height stature index within the feminine and hyperfeminine range, but the trunk breadth index smaller than one sigma below the mean, that is, narrow pelvis and broad shoulders. (Amazon)

MATERIAL

Data have been drawn from a comprehensive seven-year Growth Study elsewhere described[2, 3] and known as the University of California Adolescent Study. The group is a normal sample of urban public school children, representing a wide range of socioeconomic status, but coming largely from the lower two-thirds of the middle class. The study was originally undertaken with approximately 100 girls in the high fifth and low sixth grades of five elementary schools in Oakland, Calif.; their average age at the beginning of the study was about 10½ years.

The ninety-two records selected for the present analysis are all those which include the date of menarche and which continue with at least one physical examination thereafter. All of the girls, and all but three of their parents, are American-born. All but fourteen are of Northwest European stock; of these fourteen, eleven are of Italian descent and three are Jewish.

Semiannual medical examinations form the core of the records. Anthropometric measurements and standard body photographs were included in each physical examination.

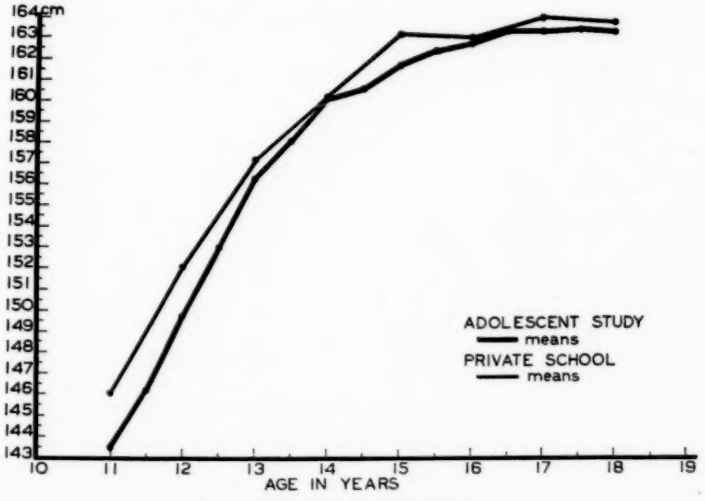

Fig. 2.—Stature (S). Average growth.

COMPARISON WITH PRIVATE SCHOOL GIRLS

In order to orient our series in relation to data already in the literature, our average measurements have been compared with those pub-

lished by Gray and Ayres for Private School Girls in the United States.[4] Although their sample is more highly selected than ours with regard to lineage and socioeconomic status, it is chosen for comparison because these Private School Standards are the ones which were used in deriving the original classification.[1] The essential contrasts are best shown by graphs. (Figs. 2 to 7.)

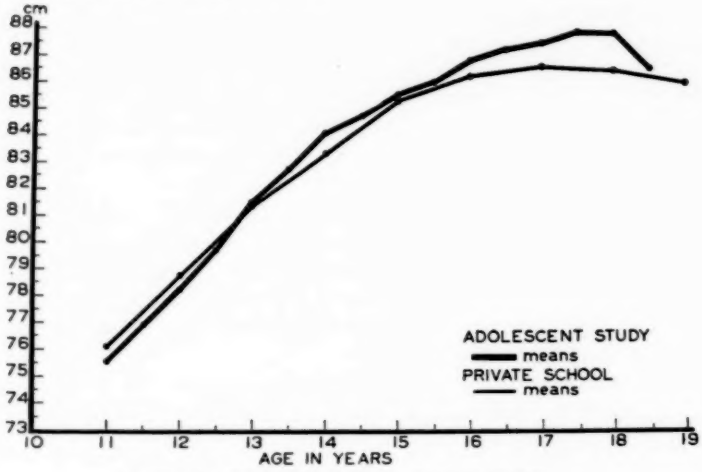

Fig. 3.—Sitting height (Si). Average growth.

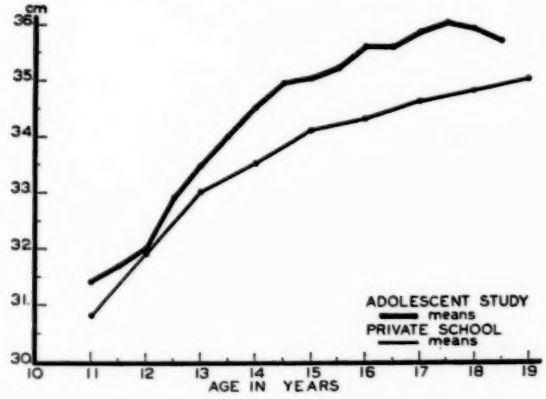

Fig. 4.—Biacromial breadth (BA). Average growth.

Stature.—Our girls are shorter at all ages, approaching closest to the taller group at the age of 14 (Fig. 2).

Sitting Height.—This was proportionately smaller at the beginning of the study, but crosses to a consistently larger average just before age 13 (Fig. 3).

Biacromial.—Our means are greater throughout. Of the four measurements used in the classification, the measurement of shoulder breadth is the least satisfactory. Some of the apparent divergence may, therefore, represent a difference in technique. This possibility is given some weight by the fact that the means for the last three ages are smaller, and these represent measurements made by a different observer. However, a smaller number in the older group could also be responsible for the drop. (See Table I for the number of girls.)

Bicristal.—The two series are identical between ages 11 and 13, after which our means are larger (Fig. 5).

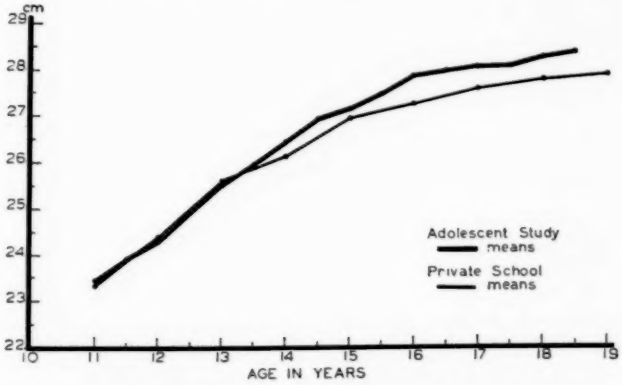

Fig. 5.—Bicristal breadth (BC). Average growth.

TABLE I

MEANS AND STANDARD DEVIATION OF INDICES IN ADOLESCENT STUDY GIRLS

AGE	NO. OF GIRLS	100 si/s		100 BC/BA	
		MEAN	σ	MEAN	σ
11.0	64	52.63	1.30	75.13	3.72
11.5	80	52.54	1.26	75.69	4.38
12.0	89	52.25	1.27	75.71	3.70
12.5	87	52.14	1.18	75.96	4.17
13.0	89	52.11	1.30	75.97	4.03
13.5	82	52.40	1.26	76.21	4.33
14.0	80	52.59	1.36	76.65	4.38
14.5	80	52.80	1.29	77.07	4.31
15.0	75	52.96	1.37	77.48	4.71
15.5	79	55.01	1.32	77.94	4.48
16.0	71	53.40	1.30	78.27	3.97
16.5	75	53.43	1.27	78.32	4.04
17.0	69	53.59	1.32	78.53	4.18
17.5	58	53.85	1.34	77.78	4.41
18.0	31	53.92	1.18	78.68	4.80

Relative Sitting Height (Sitting Height/Stature).—This is larger throughout, i.e., our girls are shorter legged (Fig. 6). This graph and the next one also show the range of one standard deviation above and below the mean. Table I gives the data for the indices for our group.

Trunk Breadth Index (Bicristal/Biacromial).—This is smaller throughout, i.e., our girls are relatively even more broad in the shoulders than they are in the pelvic crests (Fig. 7).

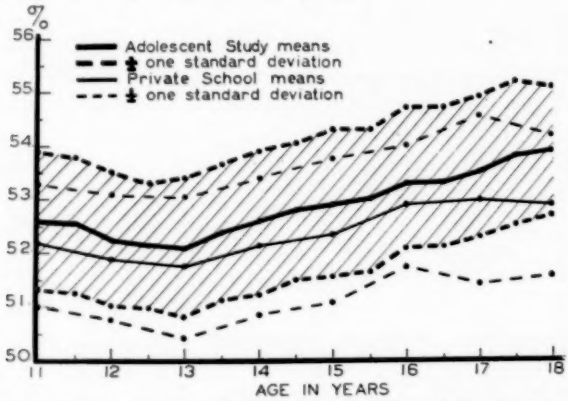

Fig. 6.—Sitting height stature index (Si/S). Averages and standard deviations.

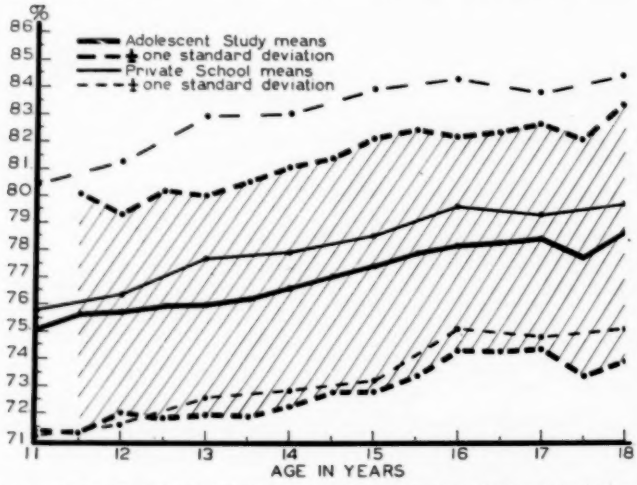

Fig. 7.—Trunk Breadth index (BC/BA). Averages and standard deviations.

It is apparent that the two groups represent populations which differ in development of body proportions as well as in stature. Especially the present group is more stocky.

When the measurements of our group at age 17 are used as a basis of build calculations, the several extreme examples have the hypothetical index values appearing in Fig. 1.

CLASSIFICATION INTO TYPES

The assignment of a type classification to each girl was approached according to the method described in the previous paper. This in-

volved, first, plotting anthropometric indices, and then determining whether breast size, body hair, and general photographic appearance were compatible with the diagnosis thus derived. Each step of this procedure requires some elaboration.

Anthropometric Index Ratings.—The girls were rated twice: first against the Gray and Ayres standards, and then against our own. Since one of the difficulties inherent in any definition of body build is the selection of correct standards of reference, it was desired to see how much influence different standards would have upon the final classification. In the present study it may be said that the private school standards were a better match racially for many of our individuals, but our own group was a better match with regard to socioeconomic selection. The indices of the Italian and Jewish girls in our series were distributed at random about our means, thus showing that they had not influenced the values for the indices to any important extent.

Had the Gray and Ayres standards been used, twelve ratings would have been changed—ten on the basis of sitting height stature index, two on the basis of trunk breadth index. The Gray and Ayres ratings would have fit the other data better in one instance, would have been equally good in three, and would have been less useful in eight. The classification as further discussed is the one based upon our own standards.

The trustworthiness of *sigma score readings* depends, of course, both upon the credibility of the means and sigmas and upon the accuracy of the individual measurements. From Figs. 6 and 7 it is apparent that for trunk breadth index the scale fluctuates too much after the seventeenth year, obviously because of the above-noted erratic behavior of the shoulder breadth averages. The sitting height stature scale shows credible increments throughout. The accuracy of an individual measurement in a longitudinal study can be checked by its position in the series. With these factors in mind, the point chosen to determine the index rating was for each index, therefore, the last point whose position on the sigma score graph lay in the main line of the plot. Thus no point representing an isolated peak or dip was accepted, and the whole graph could serve as a common sense check on the sigma score rating, just as the photograph was used later as a check on the final type rating.

Breast Size, Body Hair, and Photographic Impressions.—The next step was to make an independent evaluation of breast size and body hair by reference to examination notes and to photographs.

It was found that breast development could be judged best from photographs, because the review of a series of pictures made it possible to separate judgment of breast *size* from a rating of *stage* of development. Both front and lateral views were studied. Breast size was rated

on a scale of from 2 to 6, in which 4 was normal for the age and state of nutrition under consideration. Very small breasts were rated as 2; slightly small and slightly large breasts were rated as 3 and 5, respectively; very large, pendulous breasts were rated as 6. This is unfortunately a subjective procedure, but the desired distinctions are not very fine ones, and trained clinicians would agree reasonably well in any series.

Notes made at the time of examination as to degree of hirsutism were, contrariwise, more reliable than photographs. Both density and distribution of hair growth were considered. In most instances, however, it was only possible to rate the hair as normal or excessive, and in the final analysis the whole assessment of body hair played a very minor role.

Independent note was also made of the impression given by consideration of the whole photograph. This prevented such obvious mistakes as labeling a girl "virile" when the whole suggestion of the photograph was definitely feminine, even though individual factors might have been in keeping with a "virile" classification.

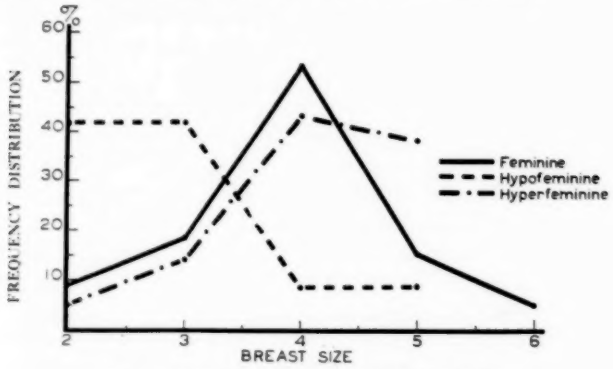

Fig. 8.—Breast size according to index rating.

The expectation was that the girls having skeletal indices in the virile and hypofeminine areas would have small breasts, the feminine group would have normal breasts, and the hyperfeminine group would have large breasts. The extent to which this expectation was fulfilled for the main groups is demonstrated in Fig. 8. The contrast between the groups having hypofeminine and hyperfeminine index ratings is especially sharp. It should be noted that the relation illustrated is between the index ratings and the breast size in both confirmed and unconfirmed cases. Where the breast size was not compatible with the index rating, the case was by definition later placed in the mixed category. Such an incompatibility, for instance, is the occurrence of large breasts with hypofeminine indices, etc.

Similarly, the expectation with regard to body hair was that the growth would be normal in the feminine group, scant in the hypofeminine, normal or excessive in the hyperfeminine, and excessive in the virile. The records were not sufficiently good to allow a test of this proposition. All that can be said is that in no girl with a hypofeminine index rating was there a hypertrichosis, whereas an excess of body hair occurred in a certain proportion of all the other groups, the highest incidence being in the hyperfeminine. Such excess was especially evident on the limbs.

A next step conceivably might have been to test the relation of descriptive characters to anthropometric deviations by calculation of correlation coefficients. But the several factors seemed in part too complex and in part too subjective to be suitable for this procedure. In any case, what is sought here is a clinically useful classification rather than a proof of genetic relations.

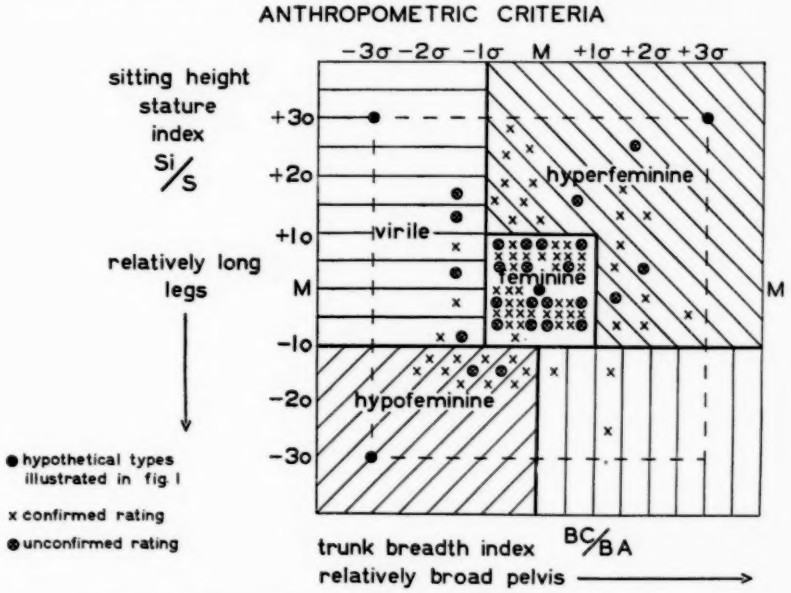

Fig. 9.—Build groups, women and girls, as delimited by index ratings.

Final Complete Rating.—The rating determined by the sigma scores was accepted when the subjective pictorial impressions were compatible and when the other data agreed according to the following rules:

Feminine: Breasts 3 or 4, body hair normal or slightly excessive.

Hypofeminine: Breasts 2 or 3, body hair normal.

Hyperfeminine: Breasts 4 or 5, body hair normal or excessive.

Virile: Breasts 2 or 3, body hair normal or excessive.

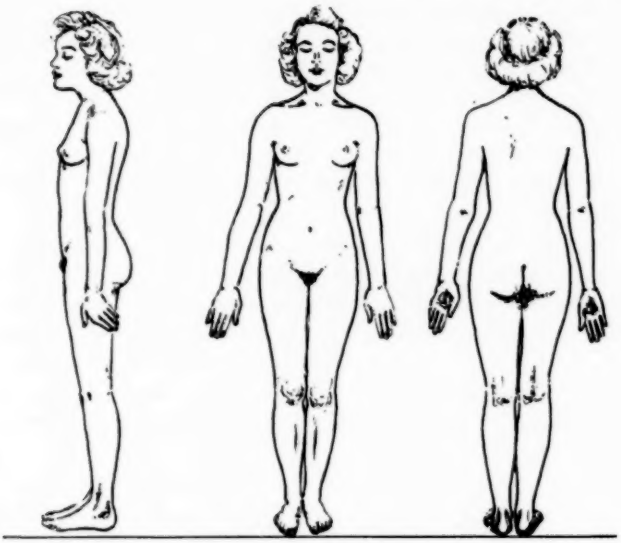

Fig. 10.—Hypofeminine build.

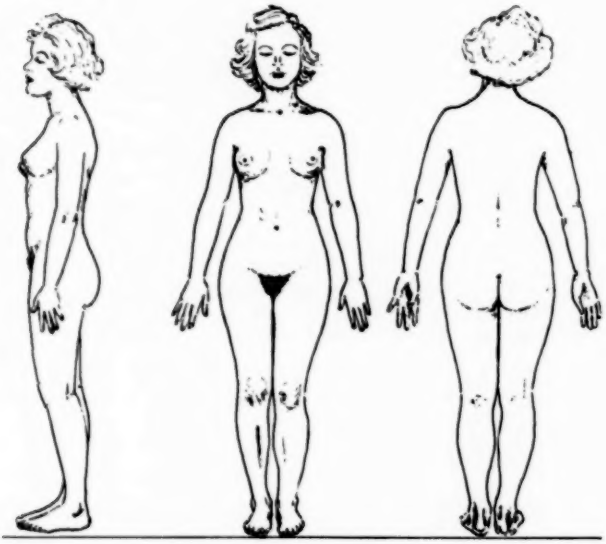

Fig. 11.—Feminine build.

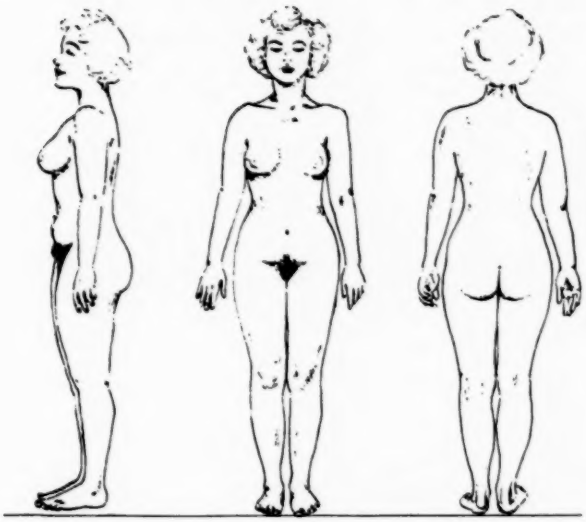

Fig. 12.—Hyperfeminine build.

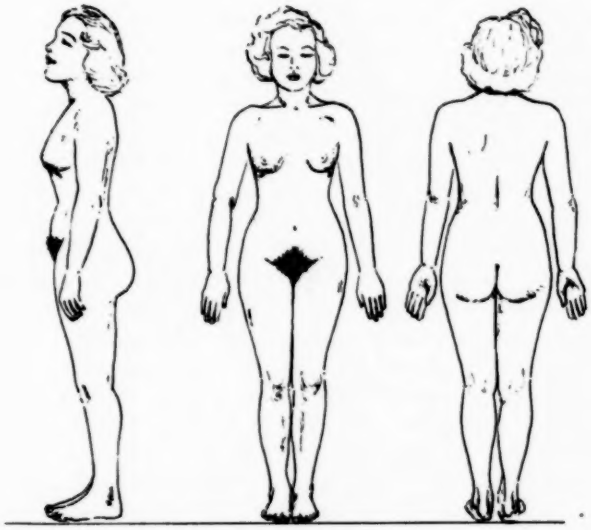

Fig. 13.—Virile build.

Where these requirements were not fulfilled, the cases were considered as "mixed."

The distribution of confirmed and unconfirmed skeletal ratings is shown in Fig. 9. In all, sixty-six girls showed agreement between proportions and other characters; twenty-six did not.

The final distribution of cases between the several groups is summarized and also compared with the distribution of the original clinic patients.[1]

	ADOLESCENT STUDY	CLINIC PATIENTS
Feminine	33	20
Hypofeminine	10	9
Hyperfeminine	18	31
Virile	2	12
Mixed	29	18
Total	92	90

An example of a girl of each type is shown in Figs. 10 to 13, which are in every case copies of photographs taken between the ages of 16.8 and 17.2. The index values, in per cent, are:

	Si/S	BC/BA
Hypofeminine	52	67
Feminine	54	82
Hyperfeminine	55	83
Virile	55	71

DISCUSSION

Sixty-three of the ninety-two girls fitted the original empirical type definitions. Although another investigator, even following the same rules, would no doubt have come out with a slightly different sorting, these build divergences seem to be real and appreciable. Lest the somewhat arbitrary nature of any such classification be overlooked, it may be recalled that had different anthropometric standards been used (namely, Gray and Ayres' instead of our own), twelve ratings in the series would have been different.

Altogether, however, the study supports the expectation that there is a relation between body proportions and body covering sufficiently close that a fair proportion of normal persons can be readily fitted to one or the other of the rough categories outlined. It may be repeated that the basic concept of the classification is prosaic enough, seeking only to sort persons according to the degree to which their external form shows characteristics which are commonly accepted as significant of secondary sex differentiation. Very simply stated, the girl considered as having an ideally feminine physique is the one who is of average proportions, whose breasts are well developed and firm, whose contours are moderately rounded by deposits of subcutaneous fat in characteristically

feminine areas, whose body hair is of expected density and distribution, and whose muscles are not overdeveloped. The classification further implies that divergences from this mean either in the direction of over- or underdevelopment of feminine characteristics are divergences away from the optimum form, as are divergences in a masculine direction.

A further word may be said about the distinction drawn between the "hypofeminine" build and the "virile" build. This is a distinction which seems to us important and one which is not often made in current clinical practice. The hypofeminine build is really an asexual, undifferentiated build, bearing a close resemblance to either the male or the female figure before puberty. Curiously, this seems to be the build which was sometimes taken as the Greek ideal of beauty for male and female alike and which twentieth century American womanhood has at times adopted as its goal.

In contrast to this, the virile female might better be subsumed under the term "bisexual." The girls classified in this and the previous paper as virile are those in whom feminine secondary sex characters are largely suppressed. But, if under bisexual were included also those persons who show secondary sex differentiation in both directions, then the classification would provide not only for those who have masculine proportions, contours, hair, and muscles, together with small breasts, as originally defined, but also for those who have such masculine manifestations, together with large breasts. Enough persons with such a hermaphroditic combination have been found (five in the adolescent group and three others in the first clinic group) to make it plausible that this broader concept of a bisexual type may prove more useful than the virile type as first described. Incidentally, this concept would fit in nicely with the recent hypotheses of physiologic hermaphroditism as evidenced by the occurrence of estrogens and androgens in both sexes.

Significance.—That two-thirds of an essentially normal group of girls could be fitted to types delimited first in a pathologic population is an interesting observation. It is interesting, too, that these types seem long since to have been crystallized for popular thought into examples well known in art and literature. But the really critical question is whether such variations in normal form have any meaning for function. If these types are the expression of constitutional or genetic patterns, they may show differences in physiologic, and even in social, tendencies.

In a search for such differences, an analysis of the menstrual and weight experience of the group will be reported.

SUMMARY

A classification of feminine build is described which seeks to sort individuals according to the degree and direction of their secondary sex differentiations. It is based upon a consideration of skeletal propor-

tions and body covering. Two-thirds of a group of normal adolescent girls could be fitted into the categories outlined, namely, hypofeminine (Diana), feminine (Venus), hyperfeminine (Rubens), and virile (Amazon). The classification, therefore, seems to be feasible and should be clinically helpful.

Acknowledgement is due to the Institute of Child Welfare, University of California, for the use of its data and for the helpfulness of its staff. Acknowledgement is also due to the Oakland Public Schools for cooperation in the adjustment of school programs, making possible a series of interviews and physical examinations. Assistance in the preparation of these materials was furnished by the personnel of Works Projects Administration Official Project No. 665-08-3-30.

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WEIGHT AND MENSES IN ADOLESCENT GIRLS, WITH SPECIAL REFERENCE TO BUILD

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SAN FRANCISCO, CALIF.

USING a classification based upon a consideration of skeletal proportions, breast development, body hair, and general body configuration, a series of ninety-two adolescent girls, representing a normal sample of urban public school children, has been divided into the following build groups: feminine (Venus), thirty-three; hypofeminine (Diana), ten; hyperfeminine (Rubens), eighteen; virile (Amazon), two; mixed, twenty-nine.[1] For the present paper, the last two subdivisions have been pooled, making a mixed group of thirty-one.

The several types were first defined by studies on women and girls reporting to an endocrine clinic because of disorders of weight and menstruation.[2] In the original pathologic population, variation in build appeared to be related to functional disturbance. The present study seeks to discover whether similar deviations in build occurring in an essentially normal group have any similar bearing upon weight and menstrual characteristics.

WEIGHT

Subcutaneous fat is responsible for a large degree of adult female variability in both weight and form. The regions in which fat tends especially to accumulate are: the mammary glands, the flanks, the abdomen, and the gluteal, cervicodorsal, prepubic, postdeltoid, subtrochanteric, and calf regions. These areas are illustrated in Fig. 1, which is adapted from Wolff.[3] Usually variations in weight involve all the accumulations, as is the case in the typically feminine builds whether they be over- or underdeveloped. Inequality of development among the deposits leads to characteristically dysplastic contours.

Consideration of the ratio of weight to stature (W in kilograms, S in centimeters) gave the simplest objective means for studying the occurrence of obesity or undernutrition among the various build groups. Where this ratio was within one standard deviation (sigma) of the mean, weight was considered normal; where it was smaller than one sigma below the mean, subjects were rated as underweight; where it was larger than one sigma above the mean the subjects were rated as overweight. Ratings were made at the same examination as were ratings of build type. This method meant, in effect, that roughly two-thirds of the girls were considered to be within clinically normal limits, and

From the Department of Medicine, Stanford University School of Medicine.

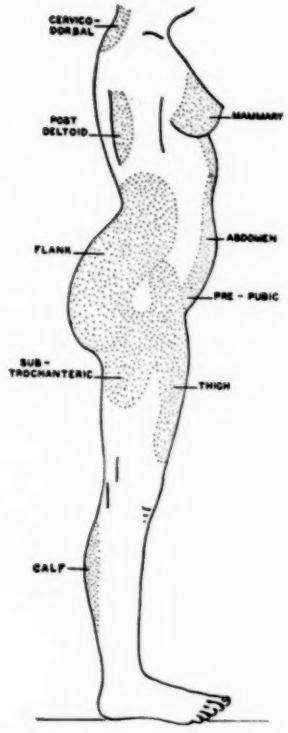

Fig. 1.—Fat distribution in the female figure.

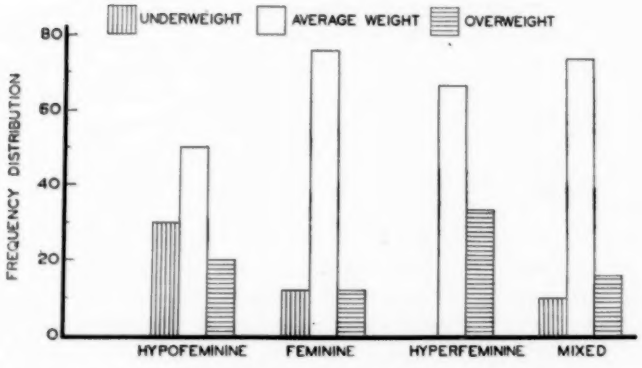

Fig. 2.—Weight stature index according to build groups.

any relation between build and weight would depend upon the distribution of instances of abnormal weight among the several build groups. The proportion of girls falling into each weight category within each build group is shown in Fig. 2.

It is apparent that the relations are not clear-cut. In all groups the majority fall within the central zone. Nevertheless, where deviations do occur, the tendencies are for hypofeminines to be thin and hyperfeminines to be heavy. This is in keeping with the findings noted in the original clinic population where underweight and overweight were frequently the presenting complaints. It should be emphasized that weight played no part in the original classification, although contours did.

MENSTRUATION

Various aspects of the function of menstruation have been examined. Miss Judith Chaffey, girls' counsellor in the University High School, collected the basic data.

AGE OF MENARCHE

The date of first menstruation is of such great interest partly because it is so striking an event. Even if another phenomenon, as time of maximum growth, should prove to be a better index of some precise pubertal point which investigators would like to define, the onset of bleeding remains too obvious a fact to overlook. Age of menarche gives at least one clue to individual maturation patterns.

Date of menarche was noted by each girl on a calendar which she had been given previously for the purpose. Accuracy of notation was checked by interviews. On this calendar was also kept the record of menstrual cycles, later discussed. Age of menarche was calculated to tenths of years just as were ages for all other examinations.

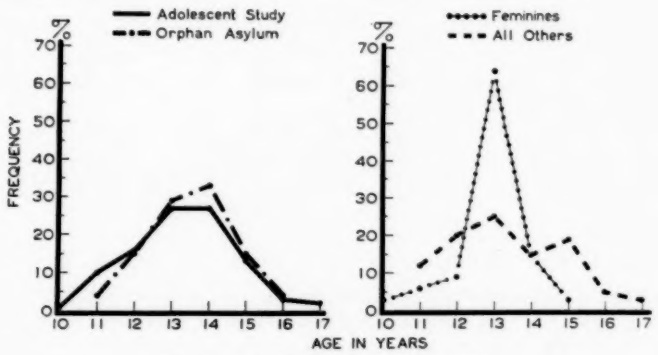

Fig. 3.—Age distribution of menarche.

The means and sigma for menarcheal age may be compared with the constants given for a Hebrew Orphan Asylum series by Engle and

Shelesnyak.[4] The latter was chosen for comparison because it is a series similarly calculated from exactly recorded ages of menarche.

	NO. OF GIRLS	MEAN (YEARS)	STANDARD DEVIATION (YEARS)
Adolescent Study	92	13.16	1.33
Hebrew Orphan Asylum	250	13.53	1.09 (our calculation)

These constants reflect no significant differences between the two groups, nor do they differ from other recent American averages. Fig. 3 shows the percentage age distribution by one-year intervals.

Menarcheal ages for the several build groups have been compared with regard to central tendency and to variability. The frequency distributions, means, and standard deviations are shown in Table I.

TABLE I

AGE OF MENARCHE:

FREQUENCY DISTRIBUTIONS, MEANS, AND SIGMAS FOR THE SEVERAL BUILD GROUPS

	AGE	FEMININE	HYPOFEMININE	HYPERFEMININE	MIXED
Early	9.8-10.2	1			
	10.3-10.7	0		1	
	10.8-11.2	1		1	3
	11.3-11.7	2		1	2
Average	11.8-12.2	0	1	3	4
	12.3-12.7	8	2	3	2
	12.8-13.2	8	1	2	4
	13.3-13.7	9	4	3	3
	13.8-14.2	3	0	0	1
	14.3-14.7	0	1	2	5
Late	14.8-15.2	1	1	0	4
	15.3-15.7			1	1
	15.8-16.2			0	1
	16.3-16.7			0	0
	16.8-17.2			1	1
Number of girls		33	10	18	31
Mean, years		12.92	13.35	13.03	13.44
Sigma, years		0.94	0.90	1.60	1.59

No important differences between *means* were demonstrated. Since the a priori expectation was that menstruation would occur early among the hyperfeminine group and late among the hypofeminines, this negative finding was somewhat disappointing.

However, a study of the differences in *age distribution of menarche* among the subgroups is more rewarding. If a narrowly normal age of menarche is taken as lying within one standard deviation of the mean, we have a normal age range of from 11.83 to 14.49 years. When the build groups are now further subdivided into those menstruating at early, average, and late ages, the picture is as shown in Fig. 4. No "hypofeminine" girl menstruated early, and very few "feminine"

girls menstruated either early or late. The flattest distribution is seen in the hyperfeminine and mixed groups.

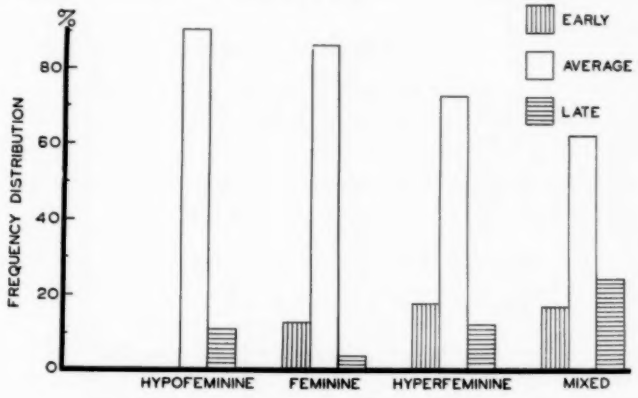

Fig. 4.—Age of menarche according to build groups.

Calculation of critical ratios shows two statistically significant differences between the standard deviations of the "feminine" and other groups. As compared with the "mixed" group, a critical ratio of 2.85 (sigma) was found, indicating a smaller variability for the feminine group. As compared with all others grouped together, the critical ratio was 2.70 (sigma), again indicating an almost certain difference in variability. The latter is the more valuable clinical observation, permitting the conclusion that the girls sorted out for strict conformity to average build standards have also a closer conformity to the average in the age at which they first menstruate. The difference is graphically shown in Fig. 3.

One further point. We know from previous investigation and from common medical lore that most girls with true primary amenorrhea have hypofeminine builds. But no greatly delayed menarche occurred among our hypofeminines. Perhaps, therefore, the syllogism cannot be inverted. Some other factor may need to enter before a girl with a eunuchoidal build will fail to menstruate. Possibly the hypoplastic girl is merely more apt than others to suffer a combination of factors leading to such an inhibition. Also, the girls in our hypofeminine group were only moderate examples of their type. Perhaps the full-blown clinical syndrome occurs only with a more extreme build deviation.

Similar reasoning leads to the speculation that the hyperplastic girl may characteristically menstruate early, but that other factors may enter which will delay menarche to normal or late years. Possibly, with the hyperfeminine girl as with the girl of atypical build, the devia-

tion from normal physical development reflects a deviation from normal in endocrine balance, such that menarche may almost as readily be delayed as accelerated.

THE MENSTRUAL CYCLE

Long neglected, in the last ten years the problem of the degree of normal menstrual irregularity has received concentrated attention from clinicians, physiologists, and statisticians. Definitely established now is the fact that normal menstrual cycles are of varying length and that the variability decreases with age. Such variability may be demonstrated either by pooling all the periods of individuals in a given group, or by computations on individual records.

Forty-two of the menstrual calendars were sufficiently complete to allow an analysis of the first year's experience. Such records consisted in crossing out, on a specially provided card calendar, each date on which there was any menstrual bleeding. Calculations are based on 469 recorded cycles.

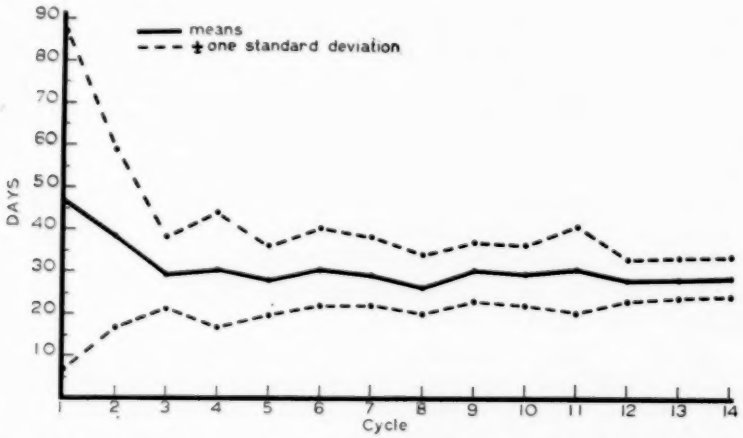

Fig. 5.—Length and variability of the menstrual cycle in the first year after menarche.

Length of cycle is commonly taken to mean the elapsed time between the onset of consecutive periods. Our data are not of sufficient magnitude to add much to an already well-documented field, but one small contribution does emerge from our figures. The great irregularity of the cycle in the first two years after menarche was demonstrated both by Engle and Arey from Engle's data. Analysis of our calendars by intervals makes it possible to see that this variability is already remarkably tapered off in the first three months. Table II and Fig. 5 show that the first two intervals average longer and are more variable than the succeeding ones; from the third interval to the twelfth the length

and variability are relatively stable. The last two cycles show an artificial reduction in variability, because these cycles represent a sorting out of the few girls who had relatively short regular cycles during the year.

TABLE II

LENGTH OF MENSTRUAL CYCLE IN DAYS

CYCLES 1 TO 14

CYCLE	NO. OF CYCLES	MEAN	SIGMA
1	42	47.14	39.79
2	42	37.98	20.67
3	42	29.22	8.33
4	40	30.38	13.11
5	37	27.72	7.94
6	38	30.53	9.11
7	37	29.47	7.86
8	36	26.89	6.70
9	35	30.08	7.06
10	34	29.71	7.04
11	32	30.84	9.86
12	24	27.92	4.82
13	18	28.50	4.42
14	12	29.00	4.70

The constants derived from our periods 3 to 12 are taken as providing the data most properly compared with Engle's figures.

LENGTH OF MENSTRUAL CYCLES IN DAYS

	NO. OF CASES	NO. OF CYCLES	SERIAL NUMBER OF CYCLES	MEAN	SIGMA	MODE
Adolescent Study	42	355	3-12	29.6	10.0	28
Orphan Asylum	100	3140	1-69	33.9	11.8	28

Analysis of the *duration of flow* also showed great variability. The range was from one to ten days, with no decrease of variability during the year. The average may be compared with that reported for California nurses by Fluhmann.[6]

DURATION OF MENSTRUAL FLOW IN DAYS

	NO. OF CASES	NO. OF PERIODS	MEAN	SIGMA
Adolescent Study	42	487	5.66	1.69
Nurses	76	823	4.6	

If on the basis of these figures, normal menstrual cycles for our group are defined as cycles falling within one standard deviation of the mean in elapsed time and in duration of flow, strictly normal menstrual cycles would show intervals of from twenty to forty days, and durations of from four to seven days. In other words, at least two-thirds of all

the cycles experienced by a group of normal girls in the first year after menarche would fall within these qualifications.

Cycles falling beyond three sigma of the mean, and thus abnormal by a common statistical definition, would be those with intervals longer than sixty days, duration longer than eleven days. The establishment of *maximum normal length* of interval is clinically important. Our choice of sixty days confirms very nicely the figure of fifty-seven days arrived at by Engle and Shelesnyak,[4] through somewhat different reasoning, and the figures of sixty days, or eight weeks, or two months commonly accepted by the laity.

Menstrual Experience According to Build.—Besides the relatively complete calendars for forty-two cases, there were incomplete first-year records on twenty-seven more. In the spring and fall of 1938, interviews with seventy-nine girls concerning their menstrual cycles gave similar, if much less accurate, data on later cycles and periods. Between these various sources, there was some information available on eighty-nine of the ninety-two girls. The data, even where they were not reliable enough to be included in the above statistical analysis, could be used to evaluate the menstrual experience of individuals. They permitted a search for girls reporting unusually long or short cycles, or unusually long or short periods of flow. They did not permit an analysis of irregularity of individual rhythms.

Based, then, on the occurrence of unusual episodes, the experience of the group may be summarized in a table. The feminine group is contrasted with the others; the other subgroups showed no appreciable differences among them.

TABLE III

	FEMININE		ALL OTHERS		WHOLE GROUP	
	NO.	%	NO.	%	NO.	%
Number in group	33	100	59	100	92	100
Number having menstrual data	32	97	57	97	89	97
Intervals outside 20-40 days or duration longer than 3-7 days	17	52	37	63	54	59
Intervals longer than 60 days or duration longer than 11 days	1	3	6	10	7	8

These findings indicate that cycles beyond the limits of one standard deviation of the average in interval or flow occur in some 50 to 60 per cent of cases, with no less tendency to such minor irregularity in the feminine group than in the others. Cycles definitely longer than our upper limits of normal, i.e., longer than sixty days in interval or with durations of flow longer than eleven days, are, however, on record for only seven cases. Of these, only one occurred in the feminine group.

Engle, incidentally, reports a much more universal occurrence of such long cycles, namely, in 75 per cent of his subjects.

Dysmenorrhea.—At the 1938 interviews, seventy-three girls were asked concerning menstrual pain (twenty-three feminine, fifty others). The girls reporting any dysmenorrhea were again about evenly divided between groups, about 50 per cent of each. Severe dysmenorrhea was reported, however, by only six girls. Again, only one of these was in the feminine classification, making an incidence of 3 per cent in the feminine group, as against 8 per cent in the others.

SUMMARY

A series of ninety-two adolescent girls has been studied with regard to certain aspects of weight, menstruation, and build.

Data on age of menarche and on the menstrual cycle are essentially similar to comparable data in the literature. Normal menstrual cycles for the group are defined as cycles showing intervals of twenty to forty days with duration of flow of from four to seven days. Definitely abnormal cycles are those with intervals longer than sixty days, flow longer than eleven days. The mean menarcheal age is 13.16 years.

Although the whole first year after menarche shows great variability in length of cycle, it is demonstrated that after the first two periods this variability already falls to a fairly uniform level.

When the girls are sorted into build groups designated as hypofeminine (Diana), feminine (Venus), hyperfeminine (Rubens), and mixed, both weight and menstrual experience show some relation to build. Although such relations are nowhere clear-cut, it may be noted that:

1. Where weight deviations occur, the tendency is toward underweight among the hypofeminines, and overweight among the hyperfeminines. Weight is judged by the weight-stature index.

2. The feminines (thirty-three) show contrasts with the others (fifty-nine) in regard to certain aspects of menstruation.

In the feminine group, (a) most of the girls reached their menarche within a very narrow range of the mean of 13.16 years, as against a much wider distribution in the others; (b) only one girl reported an interval longer than sixty days or a period lasting longer than eleven days, as against six reporting such abnormal periods among the others; (c) only one girl reported severe dysmenorrhea, as against five among the others reporting such pain.

3. No effort was made to draw conclusions about the "mixed" group, which included the two cases with "virile" builds.

CONCLUSION

Although the numbers are too small and the data too incomplete to permit final conclusions, the study gives support to the hypothesis that

a relation exists between normal build and normal function. Continued studies in the endocrine clinic in the meantime are giving support to the obverse of this hypothesis—that severe disturbances in weight and menstruation are very frequently associated with deviations from normal build.

The classification into feminine, hypofeminine, hyperfeminine, virile, and mixed builds appears to have significance in a normal group.

Acknowledgement is due to the Institute of Child Welfare, University of California, for the use of its data and for the helpfulness of its staff. Acknowledgement is also due to the Oakland Public Schools for cooperation in the adjustment of school programs, making possible a series of interviews and physical examinations. Assistance in the preparation of these materials was furnished by the personnel of Works Projects Administration Official Project No. 665-08-3-30.

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A METHOD OF DIAGNOSING IDIOPATHIC EPILEPSY

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Newark, N. J.

IF ONE were able to carry out an exhaustive investigation in determining the cause of a convulsive state, idiopathic epilepsy would be less of a wastebasket diagnosis. A complete search would often entail taking blood samples for sugar, calcium, phosphorus, and carbon dioxide determinations and roentgenograms of the long bones for lead lines, not to speak of insulin tolerance tests and encephalograms. It is obvious that such a complete investigation is hardly practical, even in the most generously endowed institutions. There is, however, a test which is of value in some of the more obscure epilepsies, especially in the entity called idiopathic epilepsy. This is the antidiuretic and superhydration test introduced by McQuarrie at the beginning of this decade.

It is the purpose of this paper to review certain features of the McQuarrie test and the results in its use at the John Gaston Hospital.

Many workers feel that if the brain of a patient with idiopathic epilepsy were examined exhaustively anatomic pathology would be found. Still others are of the impression that any changes found represent the result, rather than the cause, of the disease. This latter theory tends to base the cause of idiopathic epilepsy on a physiologic dysfunction of the cortical cell membrane.

It is known that certain factors tend to influence cell permeability. Usually those which are believed to increase permeability, such as alkalosis and superhydration, tend to precipitate epileptic attacks. Those factors which are thought to decrease cell permeability, such as acidosis and dehydration, favor cessation of seizures. It is also known that, by decreasing water intake and administering a ketogenic diet, the idiopathic epileptic patient usually is kept free from seizures. If this is true, then theoretically a seizure should be precipitated by superhydration in this type of patient.

That the mineral balance is equally as important as the water balance has been demonstrated by controlled clinical experiments. It has been found that, when a patient is superhydrated while on a salt-free regime, convulsions occur if he has idiopathic epilepsy, whereas, if sodium chloride is added to the same diet, these convulsions do not occur. The quantities of potassium and sodium excreted in the urine seem also to be correlated with the presence or absence of convulsions in these patients. Thus, potassium excretion exceeds sodium excretion during periods of superhydration on a salt-free regime followed by convulsions,

From the Pediatric Department, John Gaston Hospital. Dr. E. C. Mitchell, Chief of Staff.

Presented at the meeting of Region II of the American Academy of Pediatrics, Gulfport, Miss., March, 1940.

whereas sodium excretion predominates during periods of negative water balance and freedom from seizures. The excessive potassium excreted probably comes from the body cells, where most of it is stored. That convulsions do not occur when a nonepileptic subject receives the McQaurrie test makes it theoretical that there may be an instability of the normal physiologic properties of cell permeability in patients with idiopathic epilepsy.

The superhydration test has been used at the John Gaston Hospital with essentially the same technique as that propounded by McQuarrie.

METHOD

Procedure of the Antidiuretic and Superhydration Test.—

1. Diet: 40 per cent cream and glucose in antiketogenic proportions given every 6 hours.
2. Water: From 2 to 5 c.c. per kilogram of body weight given at from three- to four-hour intervals simultaneously with an amount of pitressin sufficient to prevent diuresis.
3. Weigh the patient every six hours after the bladder is emptied and before food or water is taken.
4. A complete record is kept on a chart of the food, water, and pitressin given and of the weight and urine.
5. A preliminary period of dehydration will facilitate occurrence of seizures.
6. The procedure is stopped when:
   - A. Convulsions occur
   - B. Symptoms of water intoxication occur
     1. abdominal cramps
     2. excessive vomiting
     3. headache
   - C. It is obvious that convulsions will not occur
   - D. Symptoms of pitressin toxicity are present
     1. Pallor of skin and mucous membranes
     2. Weakness, dizziness, and collapse
     3. Irregularity of pulse
     4. Abdominal discomfort and vomiting
     5. No convulsions or loss of consciousness

In our experience all the requirements of the procedure must be fulfilled and kept under strict surveillance to prevent mistakes and frequent failure. However, on several occasions we found it necessary to vary the method of giving fluids, the same quantities being administered, but at different intervals. In addition, because of emesis some children were able to take only sufficient glucose and cream to maintain an antiketogenic balance. On one occasion pitressin had no antidiuretic effect, fluids were rapidly excreted, and no gain had been made. After convulsions occurred, the test was repeated with the addition of sufficient sodium chloride to prevent dilution of the extracellular electrolytes (Table I and Chart 1).

During the last year we have performed the McQuarrie test on seventeen patients with convulsions. Two of these had lead encephalopathy;

TABLE I

	HOURS						TOTAL
	0	6	12	18	24	30	
Glucose (c.c.)	60	60	60	60	60	60	360
Cream 40% (c.c.)	75	75	75	75	75	75	450
Weight (lb.)	105	106	106¼	107	108	105	3 (gain)
Urine (c.c.)	200 Discarded	375	375	200	150		1100
Pitressin (amp.)	⅓	⅓	⅓	⅓	⅓	⅓	⅓	2⅓
Water (150 c.c. per hr.)	900	900	900	900	150		3,750

Table I.—Periodic record of the McQuarrie test kept during its procedure. The positive water balance and gain in weight are demonstrated. The patient developed convulsions twenty-four hours after the test was started.

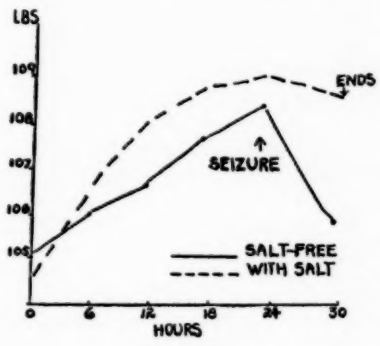

Chart 1.

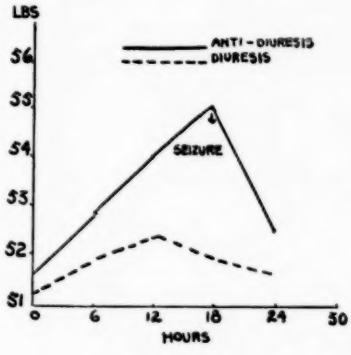

Chart 2.

Chart 1.—Typical positive test. The solid line demonstrates the gain in weight and the time of seizure. This was made from Table I. The dotted line indicates gain in weight on the same routine as in Table I, but with the addition of sodium chloride to the diet. No convulsions occurred in this instance, despite greater gain.

Chart 2.—Pitressin effect. The dotted line indicates little weight gain. The patient was in negative water balance at this time. The test was terminated as antidiuresis did not occur despite the pitressin. The solid line indicates the prerequisite weight gain and subsequent occurrence of seizures. Antidiuresis was established in this instance. This second test was done one month after the first.

one had convulsions following a blow on the head. Three patients under 3 years of age had one convulsion associated with an infection and pyrexia. One was a case of petit mal. The remaining cases had been diagnosed as idiopathic epilepsy. With the exception of two patients, all of these later cases reacted positively to the McQuarrie test. Encephalograms done subsequent to the positive tests were negative. The two failures were in a patient with hypoglycemia and in one in whom pitressin did not have the usual antidiuretic effect. The test was repeated a month later in the last case and proved positive (Chart 2).

Seventeen normal children who served as controls reacted negatively to the McQaurrie test, although gaining proportionately as much as the patients who were positive to the test (Chart 3). The child whose convulsions seemed to be precipitated by a blow on his head gave a negative

reaction to the test; subsequently, an encephalogram indicated enlargement of the left ventricle. One of our normal subjects developed symptoms of pitressin toxicity which did not simulate those symptoms of a positive test (Chart 4). The other patients with convulsions and the patient with petit mal reacted negatively to the McQuarrie test.

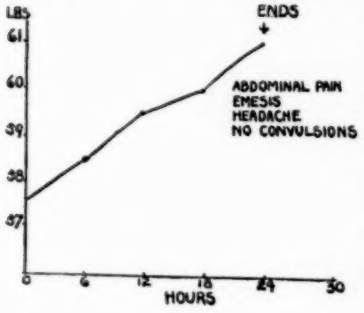

Chart 3.

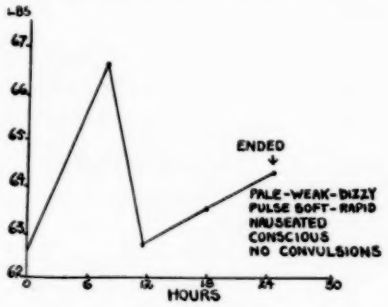

Chart 4.

Chart 3.—Typical control test, demonstrating the McQuarrie test on a 10-year-old male patient who gave a history of never having had a convulsion. The occurrence of water intoxication at the peak of weight gain is typical of the findings in sixteen other controls.

Chart 4.—B. F., 10 years old. Record of the McQuarrie test on a control who developed symptoms of pitressin toxicity. He was unable to void in the first six hours, which probably accounts for the unusual weight gain.

ILLUSTRATIVE CASE REPORTS

H. O., a white male, aged 9 years, who had given a history of three vague attacks of trembling and also a history of constant misbehavior in school, had been examined by the neurosurgical department. Both the encephalogram and ventriculogram were negative. When subjected to the McQuarrie test, he reacted positively. A diagnosis of idiopathic epilepsy was made and corroborated clinically by subsequent occurrence of typical seizures.

J. S., a white male of 7 years, had an onset of typical epileptic seizures when 3 years old. These seizures had continued up to the time of his last admission, but had seemed to be diminishing in frequency. His case had been diagnosed previously as idiopathic epilepsy, which was also our impression on his last admission. The McQuarrie test, which was done as confirmatory evidence, proved to be negative on two different occasions. Further investigation proved this to be a case of hypoglycemia with low insulin and high glucose tolerance. Appropriate management has kept him free of attacks.

We realize that our series of cases is small and that it is difficult to determine the true significance of the McQuarrie test from such a small group. We feel, however, that there is sufficient evidence to employ the test as an aid in differentiating idiopathic epilepsy from other conditions simulating it. Negative tests will often lead to further investigation and the discovery of an entity which may be treated satisfactorily. In addition, the stigma of epilepsy may be removed.

To be successful the procedure of the test must be strictly controlled. At times, however, the technique of the test may have to be varied to

suit the individual subject. We have found no difference in results with the use of tap water rather than distilled water. However, the latter certainly increases our control of the mineral balance.

There was a gain of from 2.5 to 5 per cent of the original body weight before the onset of convulsions or symptoms of water intoxication in the idiopathic epileptic patients and in those without this disease. This gain in weight is not reached if the pitressin does not act as an antidiuretic agent (Chart 2). Pitressin toxicity developed in one of our patients, with symptoms of dizziness, pallor, weak rapid pulse, and abdominal discomfort. No convulsions occurred (Chart 4).

Patients who have other causes for their convulsive states have reacted negatively to the McQuarrie test. Encephalograms did not demonstrate any structural pathology in the patients who were positive to the test. Although it has been our purpose to present this paper as a review of our experience with the McQuarrie test, we do not feel it amiss to theorize that there may be a disturbance in the normal physiologic mechanism in the cortical cell membranes of those patients with idiopathic epilepsy; and, in addition, any anatomic pathology found in these cases may have been the result, rather than the cause, of this disease.

SUMMARY

A review of the theories and the technique of the antidiuretic and superhydration test are discussed.

The results found in a series of seventeen patients with convulsions and seventeen controls are presented.

A case of pitressin toxicity is reported.

The significance of this test is suggested.

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SIGNIFICANCE OF ROUTINE NOSE AND THROAT CULTURES FOR DIPHTHERIA ON PEDIATRIC ADMISSIONS

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WHEN diphtheria was prevalent, one of the procedures instituted in aiding control was routine nose and throat cultures on admission to the hospital. It has been the custom to do this on the pediatric services of the Metropolitan and Flower-Fifth Avenue Hospitals. It occurred to us that this routine might be dictated by common usage instead of common sense, so we decided to review the nose and throat cultures for several years in an attempt to evaluate the procedure.

At the Flower-Fifth Avenue Hospital the swabs were cultured either on the Brahdy rapid culture tubes or chocolate agar slants. Neisser's stain was used on the smears, which were then examined by the laboratory technician. All smears that showed diphtheroids or questionable diphtheria were examined by the clinical pathologist, Dr. Stanford, and even those showing diphtheroids were recultured. All cases that were then suspicious were studied by the Board of Health Laboratory where virulence tests were performed as indicated.

From January, 1936, through December, 1939, nose and throat cultures were performed on 2,177 cases at the Flower-Fifth Avenue Hospital. One hundred and eighty-one cases were reported as showing diphtheria-like bacilli. It was necessary to keep these cases in the isolation unit for variable lengths of time while repeated cultures and virulence tests were performed to ascertain whether these children were harboring virulent diphtheria bacilli. Since all of our admissions must pass through a small isolation unit which acts as a "bottleneck" this delay in making isolation beds available decreased our ability to admit patients even though there were empty beds in the wards. Only one of these patients was found to harbor virulent diphtheria, and he was then transferred to the Willard Parker Hospital for Contagious Diseases. During this four-year period no patients with clinical diphtheria were admitted to the hospital and no cases of clinical diphtheria developed.

At the Metropolitan Hospital the nose and throat swabs were cultured on Loeffler's media, and Neisser's stain was used on the smears, which were then examined by the laboratory technicians. All questionable smears were re-examined by the chief pathologist, Dr. Saccone,

From the Pediatric Services of Dr. Reuel A. Benson at the Metropolitan Hospital (Dept. of Hospitals, New York City) and the Flower-Fifth Avenue Hospital.

and any that he considered as possible diphtheria were referred to the Board of Health for culturing and virulence tests.

From January, 1937, through December, 1939, nose and throat cultures were performed on 7,691 patients. There were fifteen cultures that were reported as possible diphtheria, but only four of these patients were found to harbor virulent diphtheria bacilli. One of these four was a case of nasal diphtheria which had been provisionally diagnosed as such prior to the laboratory report. One patient had been discharged prematurely from a contagious disease hospital where he had been hospitalized for nasal diphtheria, and on admission to the Metropolitan Hospital was suspected of being a possible carrier. The other two patients were carriers who had not been suspected on admission.

COMMENT

Of the total 9,868 patients in both hospitals, five were found to harbor virulent diphtheria bacilli. Two of these had been suspected clinically. Thus, our routine laboratory procedures were instrumental in unearthing only three carriers. Whether these three carriers could have produced or did produce diphtheria in contacts is questionable.

Meader[1] states; "We have 129 carriers returning to 76 schools, in contact with about 1,924 persons, with no case of diphtheria developing. Therefore, we feel quite justified in assuming that diphtheria carriers who have not been exposed to a known case of diphtheria may be ignored from a public health point of view. So sure do we feel that this inference is correct, that children and infants who are found to be diphtheria carriers unassociated with a clinical case of diphtheria are permitted to return to our child welfare clinics, and so far there have been no injurious results."

Eggleton,[2] of England, also concludes that, in the absence of clinical diphtheria, such virulent carriers are practically no source of danger.

Peacock and Werner,[3] in a comprehensive study of diphtheria carriers in Brennemann's clinic, concluded that it would seem practical to abolish the routine taking of cultures on admission of patients and to make local clinical conditions the sole criterion for culturing for diphtheria.

Barenberg[4] performed routine nose and throat cultures in 1,189 cases at Morrisania Hospital (Department of Hospitals, New York City) from December, 1937, to June, 1939. One carrier was detected, but virulence tests were not done and the patient was allowed to remain in the ward, with no cases of diphtheria developing. One case of clinical diphtheria was diagnosed in the emergency room before admission and transferred directly to the Willard Parker Hospital.

The economic and time-consuming aspects in carrying through these procedures are obvious. Furthermore, it hardly seems an appropriate

welcome to the hospital for a child to have applicators thrust up his nose and down his throat to secure cultures that are to be of no appreciable value either to himself or to others.

CONCLUSION

From this study we feel that routine nose and throat cultures may well be abandoned and performed only when indicated by local clinical conditions or a history of recent infection or exposure.

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BACILLARY DYSENTERY ACQUIRED AT BIRTH

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IN THE course of an investigation of diarrheal conditions, the authors encountered a case of bacillary dysentery in a newborn infant which they believe is sufficiently interesting to report.

R. S., a female aged 39 years, was sent to the hospital on Dec. 3, 1939, because of diarrhea and tenesmus of five days' duration and severe, bearing-down pains in the back. She was pregnant and near term. Her diarrhea was quite severe; according to her statement, she had as many as forty stools a day. They were watery and contained blood and mucus. She had vomited several times. Because of her bearing-down pains and her pregnancy, she was taken to the obstetric ward. Examination did not disclose evidence of active labor, and she was transferred to the medical ward. She had a temperature of 102.6° F. and was quite sick. She appeared toxic and was irrational at times. Her stools, which were watery, contained blood; her urine gave a 4+ acetone reaction, but was otherwise negative; her white and red blood cell counts were within normal limits.

That same night, at about 9 P.M., she had sudden, very severe pains in the back and abdomen, and delivered a baby precipitously in bed. The placenta was expressed in five minutes, with only a small amount of bleeding. The baby was a male infant and weighed 7 pounds 4½ ounces. He was immediately removed to the well baby ward in another building and never thereafter came into contact with the mother.

The mother's temperature continued high for the next forty-eight hours and then dropped to normal, remaining there except for an occasional rise to 100°. Diarrhea continued to be moderately severe until December 19, after which time it rapidly improved. During the period of her illness several blood cultures were taken, but no growth was obtained. Her blood serum did not agglutinate typhoid, paratyphoid, or *Brucella* organisms and gave a negative Weil-Felix test. Her stools were cultured in the hospital on December 4, 8, and 11, but no organisms of the enteric group were obtained. After the subsidence of the diarrhea, the patient rapidly improved, recovered her strength, and was discharged on Dec. 24, 1939.

The infant, on admission to the well baby ward on the night of December 3, was found to be in good physical condition. He was put on a modified cow's milk formula, the strength of which was gradually increased. He seemed to thrive and made some gain in weight. On December 6, he had three soft bowel movements; the next day he had four, and on the following day he had eight large, yellow, soft movements which contained mucus, but no blood. His temperature at this time rose to 101° F., and he began to lose weight. He was transferred to the sick baby ward. Here he continued to have moderate diarrhea, and his temperature varied between 99 and 101.8° F. He vomited several times. Chemical determination of his blood serum showed a protein concentration of 6.4 Gm. per 100 c.c.; the chlorides were 602 mg. per 100 c.c. (as NaCl); and the CO_2 content was 40.5 volumes per 100 c.c. of whole blood. He was put on a protein milk formula and given hypodermoclyses of normal saline solution. On December 12 he seemed

From the Bureaus of Preventable Diseases and Laboratories, Department of Health, New York City.

improved and was afebrile, but his diarrhea continued and he had lost 10 ounces in weight. The next day his temperature rose to 101.5° F.; he was drowsy and toxic and fed poorly. The temperature rose to 103.6° the following day, and he died at 7 P.M. No post-mortem was obtained.

EPIDEMIOLOGY

In the course of an epidemiologic investigation, the family was found to consist of father and mother and three children. They lived in a four-room apartment in a poor section of the city, but the house and apartment were clean and the family had its own toilet. The father and two of the children, boys aged 9 and 11 years, had had no diarrhea at any time. The third child, a girl aged 2, had had a fairly severe diarrhea, with blood and mucus in her stools, beginning November 28 and lasting about two and one-half weeks. She had been cared for at home and had been seen once by a private doctor. No stool examination had been made. At the time that this child took sick, the mother had already been ill for a day or two with diarrhea. Investigations of the milk and water supplies and of possible contacts did not yield any clues to the source of the mother's infection.

Stool specimens from all members of the family were obtained on different days, at least three specimens from each person. The specimens were collected in small bottles containing 25 per cent glycerin in normal saline solution. They were delivered to the laboratory on the same day and on arrival were inoculated on desoxycholate citrate agar medium.[1] Stool specimens from the newborn baby which had been obtained several days before his death were similarly examined. The bacteriologic procedures carried out were similar to those used by Hardy and co-workers[2] in their studies. Briefly, they are as follows: After incubation for from twenty to twenty-four hours, suspicious colonies are fished on to Krumwiede's triple sugar medium and incubated for from sixteen to twenty hours. Colonies giving *Shigella* reactions are fished and plated for purity. Preliminary tests are made with type specific antisera, and the organisms are also examined for motility. Inoculations are made into sugar tubes, and fermentations are read in from twenty-four to seventy-two hours. Lactose and sucrose tubes are observed daily for at least fourteen days. Detailed serologic studies are carried out on all organisms with specific antisera. Mannitol fermenters are tested with Flexner and Sonne antisera. Flexner organisms are further classified in the V, W, X, Y, and Z groups by means of agglutination reactions with type specific antisera of these groups.

We were unable to recover any pathogens from the stools of the father and the three children, except for an incidental *Salmonella* organism which was recovered from the father's first specimen. However, from each specimen of stool obtained from the mother and from her newborn infant, we were able to recover *Shigella dysenteriae*, Flexner Type V. The mother's stool continued positive until Jan. 18, 1940.

The next stools examined after that date were collected on February 27 and 28. No growth of dysentery bacilli from these specimens was obtained.

COMMENT

The mother and her infant both had the same type of *Shigella* organism in their stools. There is little doubt that the newborn infant received his infection from the mother, and at the time of birth. Although the contact was for a short period of time, the mother was suffering from very marked diarrhea at that time and probably expelled fecal material with her bearing-down pains. The child's birth was precipitous, without the attendance of a physician and without preparation of the mother. Prenatal infection is ruled out, because the infection would have had to be through the blood stream; however, the mother's blood cultures were sterile. There was no opportunity for the infant to become infected later on, since he was removed from the mother immediately after birth and did not come in contact with her at any subsequent time. The infant was taken to a well baby ward where there were no cases of diarrhea. He received his feedings from the same formula room where the food for all the other infants was prepared, and the food, bottles, and other utensils were sterilized.

Epidemics of diarrhea among newborn infants are not uncommon in nurseries, but true bacillary dysentery infections are extremely rare. During the past five years epidemics of diarrhea in newborn infants have been studied intensively by Frant and Abramson.[3] Reports of single diarrheal epidemics have also been made during this period by Barenberg, Levy, and Grand,[4] Craig,[5] Greenberg and Wronker,[6] Baker[7] and others. Although careful bacteriologic work was done in many of these studies, *Shigella dysenteriae* was not recovered in any of the outbreaks. The only exception is in the report of Aitoff and Daunay[8] who isolated a gram-negative, nonmotile organism from the stools of three babies in a small epidemic in a newborn nursery; they classified the organism as intermediary between the Shiga and Flexner types. They based their classification upon sugar fermentation tests. The organism gave *Shigella* reactions in the fermentation tubes, but it fermented xylose and gave an alkaline reaction in litmus milk. These sugar reactions are typical of *Shigella alkalescens*, the specific pathogenicity of which is still in doubt.

The finding of dysentery bacilli in the stools of newborn infants in nonepidemic diarrheas is also extremely rare. We were able to find only two reports in the literature. Marckwald,[9] in 1901, reported the case of an infant who lived only two hours. At autopsy eight hours later, a culture taken from the heart's blood yielded a growth of Kruse bacilli. A similar organism was recovered from the mother's feces. No details are given of the bacteriologic methods used. Kerrin and Gill[10] report the case of an infant who was breast-fed and developed loose

stools forty-eight hours after birth. Flexner dysentery bacilli were isolated from his stools. A rectal swab from the mother, who was well, yielded a growth of a similar organism.

The incubation period of bacillary dysentery is short. Usually it is given as from one to several days. In our case, where the incubation period could be determined exactly because of the circumstances of the infection, it was two and one-half days. In Kerrin and Gill's case, cited above, it was not more than forty-eight hours. In an accidental laboratory infection with a Flexner bacillus reported by Lippincott,[11] it was six days. In another accidental infection in the laboratory reported by Woolpert, Marsh, and Yaw,[12] it was almost exactly forty-eight hours.

SUMMARY

A case of bacillary dysentery, Flexner Type V, occurring in a newborn infant who was in contact with its mother, the source of the infection, only at the time of birth, is reported. The incubation period was two and one-half days. The child succumbed on the twelfth day of life.

We wish to thank Dr. Charles Hendee Smith, Director of the Children's Service, Bellevue Hospital, for permission to examine the infant's chart.

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A STUDY OF THE INCIDENCE OF ILLNESS AMONG INSTITUTIONAL CHILDREN

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THE Child Hygiene Committee of the San Francisco Community Chest was appointed in 1934 and assigned the task of studying the protection of the health of children under the care of the voluntary child-caring agencies. The committee, after a preliminary survey, formulated a set of medical standards to govern the supervision of the health of the children. Details of this work have been published previously.[1, 2] It was soon found, however, that the practical application of the standards raised such questions as: How large an infirmary should an institution have? What type of dispensary was suitable and how much work should be done in it? How many hospital days' care were needed? In order to obtain some workable figures to help solve these problems, a special study of the actual incidence of illness in a selected group of children was planned.

In 1936, therefore, several of the child-caring institutions were asked to cooperate in the keeping of uniform records of the sicknesses occurring among the children over a period of several years in order that a determination of the actual incidence of illness might be made. If records were kept carefully by three or four representative institutions, the figures in the main should be applicable to other groups of the same ages in comparable institutions. The figures might also be of interest when compared with those for children in their own or foster homes.

After consultations with the directors of the institutions and the Bureau of Audits and Statistics of the Community Chest, the form given below was adopted and sent with full instructions to the cooperating institutions.

_____
Name of agency

Institutional Record of Illness

Sheet No. _____

From _____ 19____

To _____ 19____

Name	Age Yrs.	Age Mos.	Sex	Diagnosis	Illness Date of Onset	Illness Date of Discharge	No. of Days' Care Infirm.	No. of Days' Care Hosp.	Amount of Hospital Bill ($)

Total: Cases _____ Days' care _____

MATERIAL STUDIED

At the close of 1938 it was found in reviewing the work that four institutions had maintained the records over a period of three years in a manner satisfactory for analysis. These institutions totaled 567 beds, less than one hundred of the beds being used for preschool children. The upper age limit was 16 years. The preschool children were not in school; the others attended the public schools of the city. Both sexes were adequately represented. All the institutions cared for normal children, orphans, divorce orphans, or semiorphans.

In all the institutions there was a fairly rapid turnover. The average number of children under care per year for the three years in the four institutions was 840.7. The number of days of care given per year for all children averaged 164,327.

The average number of days of care given per child was 195.4. Some institutions have a more rapid turnover than others, and the amount of medical work done varies considerably, depending upon the rapidity of new admissions. Much laboratory and corrective work does not have to be repeated.

One other variant should be borne in mind in interpreting the figures. Many minor illnesses and upsets occur in children and may be given more importance by one observer than another. One may deem it wise to put a child to bed for observation for any trivial complaint, and another may treat the same more casually.

A survey of the Department of Health's reports on communicable diseases reveals the years under study as fairly typical for the city.

The medical work in an institution is divided between the dispensary, the infirmary, outside clinics, and the hospital. The amount of work done by each varies with the policy and equipment of the institution.

DISPENSARY WORK

The record of visits to the institution's dispensary presents the most marked variations and cannot be tabulated to advantage. Dispensary visits usually represent minor problems, well or routine examinations, and follow-up observation after acute illnesses. Many minor treatments and inspections are done by the nurse, and sometimes by the matron, especially when she is a trained nurse. The problems saved for the days that the doctor visits the dispensary are fairly comparable to pediatric office work. From the accumulated figures of institutions with a regular dispensary service and a nurse in charge, it is estimated that, on an average, fifteen children for every 100 in the institution will visit the dispensary per day for five days a week. The institution should be provided, therefore, with a dispensary and workers to care for at least this number.

OUTSIDE CLINIC ATTENDANCE

The number of visits made by the children to outside clinics also varies within a wide range. The reliance on outside clinics depends largely upon the equipment and medical attention given in the institutions' dispensaries and infirmaries, but also upon the admission policy of the institutions and the kind of children under supervision. Most of the institutions now require a complete medical study, including a Wassermann test, tuberculin test, and, in so far as possible, correction of defects before admission. If this is not done prior to entry, the amount of routine work done by the institution is increased considerably.

Since many of the children have one or both parents living, provision is often made for the child, if sick, to be taken home and cared for privately. It should also be added that visits to clinics are very time-consuming procedures, and institutions with a limited staff of workers find it difficult to allot time for such visits and, therefore, prefer to provide for as much as possible of the ambulatory work to be done in the dispensary or infirmary.

The reports of three institutions on clinic visits varied as follows:

1. 39 visits per year per 100 children under care.
2. 350 visits per year per 100 children under care.
3. 141 visits per year per 100 children under care.

The ambulatory work done for these children, therefore, is at best rather inaccurately estimated. If it is comparable to the office work of the pediatrician, the figures of division between ambulatory and sick work in a private pediatric practice may be of interest. The figures below are from the private practice of Dr. Shaw and Dr. Thelander[3] for the years indicated:

1936		1937		1938	
Home	Office	Home	Office	Home	Office
59.2%	40.8%	58.3%	41.7%	53.3%	46.7%

INFIRMARY AND HOSPITAL CARE

The major medical work, that of the infirmary and hospital, is more readily studied. An analysis of this work is recorded in the first twelve tables. In this study Aldrich's[4] analysis of his private practice was freely consulted. Aldrich, however, included his office cases in his study, and the figures would not be comparable to the present study which omits classification of dispensary and clinic calls. For comparison, therefore, the private practice cases of Dr. Shaw and Dr. Thelander[3] have been analyzed in the same manner as the institutional cases, that is, the office work and well-baby work were omitted from the tables now under comparison, and these figures from private practice should be fairly comparable to those of the cases in the institutions. This private practice analysis was made from a daily diary on home and hospital

calls for the years 1936-1938. This group has the additional advantage of being drawn from the same general locality as the institutions.

An attempt has been made to keep the divisions the same as Aldrich's when possible, but a few minor changes and one major one have been made. Aldrich classes his cases of influenza or grip with the acute contagious diseases. It was felt, however, that to select the cases of influenza or grip from among the other respiratory diseases as listed by the institutions would lead to such inaccuracies as to make the differentiation useless. The cases diagnosed as "flu" or grip were therefore placed under the one heading "grip" and classed with the respiratory diseases. In addition, all cases diagnosed as upper respiratory infection not specified as tonsillitis or pharyngitis were placed under the same heading "grip." Fractures were left in surgery as Aldrich had placed them, although they probably belong in the group "accident." Circumcision was placed in surgery, and eczema was placed in the allergic group.

The acute upper respiratory diseases which are responsible for 45 per cent of the bed patients can usually be cared for in the infirmary. Only a small percentage of this group needed to be hospitalized; otitis media caused more hospitalization than any of the other complaints, probably mostly for paracentesis which is a surgical procedure.

TABLE I

ACUTE INFECTIONS OF THE UPPER RESPIRATORY TRACT

DIAGNOSIS	CASES	NUMBER OF DAYS OF CARE	
		HOSPITAL	INFIRMARY
Grip	594	27	2,956
Pharyngitis	119	76	554
Otitis media	125	104	735
Tonsillitis	58	13	361
Cervical adenitis	22	28	162
Laryngitis	14	0	121
Sinusitis	6	0	31
Conjunctivitis	44	0	216
Stomatitis	11	0	168
External otitis	2	0	3
Total	995	248	5,307

The acute contagious diseases offer a trying problem in the institutions even though a relatively high percentage of the children in the school age group will have had the common contagious diseases such as pertussis, measles, chicken pox, and mumps. When these diseases are prevalent in the city and the children attend the public schools, it is usually not feasible to try to check an epidemic by removing the children infected from the home because new contacts in school are certain to occur and keep a series of new cases constantly occurring in the institution. Unless more than one type of contagious disease occurs at a time, the infirmary should be equipped to care adequately for measles, pertussis, chicken pox, and mumps, as well as other less serious or less contagious

TABLE II

ACUTE AND CHRONIC CONTAGIOUS DISEASES

	CASES	NUMBER OF DAYS OF CARE	
		HOSPITAL	INFIRMARY
Measles	72	0	680
Pertussis	28	0	1,358
Chicken pox	55	0	712
Scarlet fever	29	142	432
Mumps	62	5	708
German measles	1	0	5
Erythema infectiosum	5	0	23
Mononucleosis	7	6	81
Diphtheria carriers	5	0	26
Syphilis	1	0	5
Tuberculosis	11	3	120
Rheumatic fever	3	45	94
Total	279	201	4,244

conditions. Scarlet fever is a somewhat different problem. Although not as highly contagious as the above-mentioned, in an institutionalized group it is very prone to spread and even to cause severe sore throats in children, as well as in adults, who have had the disease previously, and the consequences may be serious. Unless the infirmary is well equipped for isolation and the nursing and medical attendance adequate, scarlet fever cases cannot be cared for readily in an institution's infirmary. Also, if several types of contagious diseases occur at one time, it is safest to segregate by hospitalization. In the average institution it is not feasible to have an infirmary equipped for handling the entire communicable problem. The overhead due to separate units, bathrooms, nursing care, and other equipment necessary for adequate isolation is very high. If there is a contagious hospital in the city, its wards should be available for the overflow of contagious cases in the institutions.

With the routine immunization of children against diphtheria, this disease has ceased to be a problem. If all the children are Schick negative, it would seem logical to dispense also with the routine culturing of throats for the Klebs bacillus.

TABLE III

ACUTE PULMONARY INFECTIONS

DIAGNOSIS	CASES	NUMBER OF DAYS OF CARE	
		HOSPITAL	INFIRMARY
Bronchitis	7	0	80
Pneumonia	12	82	161
Total	19	82	241

The gastrointestinal cases required seemingly a relatively high number of hospital days, although the average hospital days of care per case was low. If the individual records were to be examined, it would probably be found that most of the cases were hospitalized as appendicitis suspects. If one turns to the surgical table, one will find the

wisdom of this procedure, for thirty-one cases of acute appendicitis did occur and only one of these ruptured.

Surgical conditions required the most hospital care.

TABLE IV

GASTROINTESTINAL DISORDERS

DIAGNOSIS	CASES	NUMBER OF DAYS OF CARE	
		HOSPITAL	INFIRMARY
Vomiting	1	0	7
Diarrhea	15	4	103
Abdominal pain	11	20	48
Catarrhal jaundice	1	12	36
Gastrointestinal upset	246	8	663
Pinworms	1	0	0
Total	275	44	857

TABLE V

SURGICAL CONDITIONS

DIAGNOSIS	CASES	NUMBER OF DAYS OF CARE	
		HOSPITAL	INFIRMARY
Acute appendicitis (one ruptured)	31	334	262
Fractures	9	40	88
Tonsillectomies	178	376	1,052
Mastoidectomies	17	258	352
Abscesses	29	166	302
Plastics	4	79	70
Bursitis	1	0	4
Dermoid cyst	1	40	23
Cartilage from knee	1	15	0
Cyst (bone)	1	18	0
Circumcision	13	21	21
Miscellaneous	11	31	19
Total	296	1,378	2,193

TABLE VI

CUTANEOUS LESIONS

DIAGNOSIS	CASES	NUMBER OF DAYS OF CARE	
		HOSPITAL	INFIRMARY
Local infections	29	0	127
Toxic erythema	14	0	75
Dermatitis	10	0	34
Ringworm	2	0	0
Poison oak	27	0	125
Impetigo	36	0	142
Insect bites	5	0	17
Scabies	26	0	150
Stye	4	0	14
Herpes zoster	3	5	4
Athlete's foot	4	0	23
Total	160	5	711

Genitourinary conditions have a relatively high rate of hospitalization, and vaginitis particularly so. A case of gonococcic vaginitis in an institution is rightly viewed with alarm, for the spread of the infection may be very rapid and the elimination of it almost impossible.

TABLE VII

ACCIDENTS

DIAGNOSIS	CASES	NUMBER OF DAYS OF CARE	
		HOSPITAL	INFIRMARY
Cuts and abrasions	11	3	24
Sprains	7	0	13
Foreign body	1	0	1
Burns	1	0	4
Head injury	10	13	17
Nail in foot	2	0	6
Total	32	16	65

TABLE VIII

GENITOURINARY CONDITIONS

DIAGNOSIS	CASES	NUMBER OF DAYS OF CARE	
		HOSPITAL	INFIRMARY
Pyelitis	11	35	76
Nephritis	1	14	1
Vaginitis	6	64	5
Epididymitis	1	19	0
Total	19	132	82

TABLE IX

ALLERGIC MANIFESTATIONS

DIAGNOSIS	CASES	NUMBER OF DAYS OF CARE	
		HOSPITAL	INFIRMARY
Asthma	6	0	38
Urticaria	2	0	7
Serum sickness	1	0	2
Eczema	3	0	288
Total	12	0	335

TABLE X

NUTRITIONAL AND GLANDULAR DISTURBANCES

DIAGNOSIS	CASES	NUMBER OF DAYS OF CARE	
		HOSPITAL	INFIRMARY
Obesity	1	12	0
Malnutrition	3	0	25
Hyperthyroidism	1	0	117
Adenitis (noncervical)	5	0	15
Total	10	12	157

TABLE XI

NERVOUS AND PSYCHOLOGIC DISORDERS

DIAGNOSIS	CASES	NUMBER OF DAYS OF CARE	
		HOSPITAL	INFIRMARY
Emotional upset	6	0	9
Epilepsy	1	0	201
Total	7	0	210

The allergic diseases and the glandular conditions are usually treated in the dispensary and the clinics and, therefore, do not figure largely in this study of bed patients.

The patients with nervous and psychologic disorders likewise are usually ambulatory patients and would not be included under bed care. Furthermore, children who present the major problems of this nature are usually not admitted to institutions, as they are better cared for in foster homes or special institutions.

TABLE XII

MISCELLANEOUS CONDITIONS

DIAGNOSIS	CASES	NUMBER OF DAYS OF CARE	
		HOSPITAL	INFIRMARY
Toothache	4	0	9
Vaccine reaction	15	0	54
Reaction to injection	1	0	3
Observations:			
Cause not stated	30	49	452
Headache	39	41	75
Cardiac	1	0	1
Vaginal discharge	7	0	16
Tetany	1	0	5
Pain in limb	3	5	7
Fever	4	12	44
Cough	2	0	68
Total	107	107	734

TABLE XIII

SUMMARY SHOWING FREQUENCY OF VARIOUS GROUPS

GROUP	DIAGNOSIS	CASES	NUMBER OF DAYS OF CARE	
			HOSPITAL	INFIRMARY
1	Acute infections of the upper respiratory tract	995	248	5,307
2	Acute and chronic contagious diseases	279	201	4,244
3	Acute pulmonary infections	19	82	241
4	Gastrointestinal disorders	275	44	857
5	Surgical conditions	296	1,378	2,193
6	Cutaneous lesions	160	5	711
7	Accidents	32	16	65
8	Genitourinary conditions	19	132	82
9	Allergic manifestations	12	0	335
10	Nutritional and glandular disturbances	10	12	157
11	Nervous and psychologic disorders	7	0	210
12	Miscellaneous conditions	107	107	734
	Total	2,211	2,225	15,136

Table XIV compares the figures from the institutions with those of the home and hospital cases in the local private practice group expressed in percentages of the total. The figures are surprisingly close in the two groups. The higher percentage of surgery in the institutional group is accounted for by tonsillectomies and circumcisions; in private

TABLE XIV

COMPARISON OF INSTITUTIONAL GROUPS WITH PRIVATE PRACTICE GROUPS (OMITTING OFFICE) DURING 1936-1938

(ARRANGED IN ORDER OF FREQUENCY)

GROUP	DIAGNOSIS	INSTITUTIONS		PRIVATE CASES
		CASES	PERCENTAGE	PERCENTAGE
1	Acute infections of upper respiratory tract	995	45.0	48.0
5	Surgical conditions	296	13.4	4.8
2	Acute and chronic contagious diseases	279	12.6	13.4
4	Gastrointestinal disorders	275	12.4	12.2
6	Cutaneous conditions	160	7.2	4.4
7	Accidents	32	1.4	3.2
3	Acute pulmonary infections	19	0.9	5.4
8	Genitourinary conditions	19	0.9	0.9
9	Allergic manifestations	12	0.5+	5.0
10	Nutritional and glandular disturbances	10	0.4+	1.0
11	Nervous and psychologic disorders	7	0.4–	0.3
12	Miscellaneous	107	4.8	1.4

pediatrics this work was referred to a surgeon, and frequently the record did not go into the diary, being noted only on the child's office record.

The higher percentage of severe pulmonary cases in the private group is accounted for by consultations and referred work, mostly pneumonias. It is especially worthy of note that the gastrointestinal conditions are equal in the two groups. During the past three years there has been a high incidence of a mild gastroenteritis in the city. The condition is usually ushered in by a headache, vomiting, and varying degrees of fever for one day, followed by a fairly mild diarrhea. Ordinarily the condition is not severe enough to justify hospitalization or further investigation of the stools. The Public Health reports are limited to the specific dysenteries, typhoid, paratyphoid, and food poisonings, and they do not reflect the incidence of this mild gastroenteritis. If the incidence in private practice were not available for comparison, the conclusion might readily be drawn that the high incidence of gastroenteritis reflected institutional epidemics.

Table XV is an analysis of hospitalization and infirmary care. The table gives the average days' care per case for each group and also the percentage of the total for each group. Surgical conditions, which represent only 13.4 per cent of all the cases studied, have 61.9 per cent of the hospital days. The respiratory, contagious, and pulmonary conditions account for most of the rest. The genitourinary group ranks unduly high because of one case of specific vaginitis requiring long hospitalization. In a small series of cases a long-time hospitalization of one case raises the average quickly. If the original tables are consulted, it will be seen that long bed care of one case accounts for the high aver-

ages of infirmary days in the allergy, nervous and psychologic, and glandular and nutritional groups. One epileptic, for instance, accounts for most of the infirmary care of the nervous and psychologic group. (In addition to the hospital and infirmary care given, one child spent seventy-two days at a health farm, and 638 days' dormitory care were given. These figures were not put into the tables because they concerned only a very few cases.)

TABLE XV

AVERAGE DAYS' CARE BY GROUPS

(ARRANGED IN ORDER OF HOSPITAL DAYS' CARE BASED ON PERCENTAGE OF TOTAL)

GROUP	DIAGNOSIS	PERCENTAGE OF TOTAL HOSPITAL DAYS	AVERAGE NUMBER OF HOSPITAL DAYS' CARE PER CASE	AVERAGE NUMBER OF INFIRMARY DAYS' CARE PER CASE
5	Surgical conditions	61.9	4.7	7.4
1	Acute infections of upper respiratory tract	11.14	0.25	5.3
2	Acute and chronic contagious diseases	9.08	0.7	15.2
8	Genitourinary conditions	5.94	6.9	4.3
12	Miscellaneous	4.8	1.0	6.9
3	Acute pulmonary infections	3.68	4.3	12.7
4	Gastrointestinal disorders	1.98	0.16	3.1
7	Accidents	0.72	0.5	2.0
11	Nutritional and glandular disturbances	0.54	1.2	15.7
6	Cutaneous conditions	0.2	0.03	4.4
10	Allergic manifestations	0.0	0.0	27.9
9	Nervous and psychologic disorders	0.0	0.0	30.0

During the winter of 1935-1936, the United States Public Health Service[5] made a survey of the days of disability per year from various causes for different income groups. The average number of days of disability from all causes and for all income groups for children under 15 years of age was 5.8 days. This classification is comparable to the number of sick days per child under care obtained in this study. In 1936 the number of sick days per child under care was 5.9; in 1937, 7.7; and in 1938, 7.1.

COMMENTS

The care of dependent children has improved markedly, but the medical programs for these children have lagged behind housing and feeding. When it is remembered that orphaned children originally were housed with vagabonds and derelicts, it is not surprising that those in charge of children's institutions should guard their inmates rather jealously from outside criticism. A false attitude that has been hard to eradicate is that normal children properly housed and fed should not become sick; this attitude has led to a secretiveness and even a denial of illness in institutions. It is obvious that, until those in charge recognize the neces-

sity for routine examination of well children and the normal occurrence of certain infections, accidents, and other diseases, it will be impossible to establish ideal health services for the children so housed. Health services in private schools, colleges, and universities have progressed more satisfactorily than these services in other institutions. Part of the development must be attributed to the frank facing of facts by the people in charge of schools instead of the false belief that illness in an institution reflects neglect on the part of the attendants.

Although some larger institutions have maintained a complete medical service including operating facilities, the increasing tendency to care for dependent children in foster homes or small cottages tends to discourage large institutions which alone could afford such a complete medical setup. Instead, there is a greater tendency to use the available free or part-pay medical services in the community for children under the supervision of child-caring agencies. It might be feasible for the agencies and institutions to place the children under a health insurance if and when such a one is available for that type of child. Until some such arrangement is available, the institutions need a paid medical attendant who will visit the dispensary and infirmary regularly. In a general way, it may be stated that an institution caring for 100 children should provide for a dispensary service accommodating approximately fifteen visits a day for five days a week. It should have an infirmary that would care for approximately 600 patients during the year.

In addition to this medical work at the institution, there should be a close affiliation with a hospital for clinic consultations and for available beds when necessary. The clinic connection should, if necessary, provide for 350 visits a year. Provision should be made also for between 80 and 100 hospital days' care.

On an average, each child will be in bed six or seven days of the year, and over 50 per cent of the bed care will be for respiratory infections.

This study represents fairly accurately the amount of routine well work, preventive work and sick care that is required for adequate medical supervision of children between the ages of 1 and 15 years.

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384 Post Street

FOREIGN BODY IN THE HEART

Case Report

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REPORTS of foreign bodies in the heart are not uncommon, especially in the literature of the postwar period. A wide variety of objects have been found at operation or at autopsy, such as bullets, shell fragments, glass,[1] needles, nails, pins, toothpicks, fishbones, and even an aluminum pipestem.[2] Decker,[3] in a review of 109 cases of foreign bodies in the heart and pericardium which have been reported since 1900, found the following incidence: bullets, sixty-three cases; shrapnel, twenty-two cases; needles, eighteen cases; and miscellaneous, six cases.

The case to be reported is that of the spontaneous recovery of an infant who had a piece of wire in the heart; the foreign body was subsequently expelled spontaneously from the body.

CASE REPORT

F. N., a 9-month-old female infant, was admitted to the pediatric service on March 8, 1937, because of swollen legs.

History.—The child was born on June 3, 1936, as the result of the seventh pregnancy of a 34-year-old woman. The confinement and neonatal period were normal. Physical examination of the baby at birth was negative, except for a small rectal polyp. This polyp was not treated and on subsequent examinations appeared diminished in size.

The patient was well until the middle of January, 1937, when she had mild bronchitis, followed on February 5 by pneumonia in the left lower lobe. The temperature subsided by lysis in twelve days, but the child remained listless and anorexic, occasionally vomiting. One week before admission, distention of the abdomen was noted, and five days later, swelling of both legs.

Examination.—On admission the child appeared well-developed and weighed 8,680 Gm., but she looked chronically ill and was apathetic. The fontanel was soft. There was percussion dullness at the base of the left lung, with fine and medium crepitant râles all over the left side and in the right posterior axillary line. The apex of the heart was not located; the heart sounds were distant, and there were no murmurs or thrills. There was dullness in both flanks and dull tympany over the entire abdomen which was obviously enlarged. The liver was palpable 4 cm. below the costal margin as a very hard, nontender organ with a sharp edge. The tip of the spleen could be felt. There was pitting edema of both legs and over the sacrum. The temperature was 37.5° C., pulse, 120 per minute; respiration, 30 per minute; and blood pressure, 84/68.

Laboratory Data.—The blood count showed 3,760,000 red blood cells per cubic millimeter, 12,350 white blood cells per cubic millimeter, 10 Gm. of hemoglobin, and a normal differential count and normal smear. There was a slight trace of

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albumin and an occasional leucocyte in the urine, both appearing intermittently for the next month. Unclassifiable pneumococci were present in the throat. The blood culture was negative. Tillett's antifibrinolysin test was positive, complete lysis occurring in from eight to twenty-four hours. Roentgenographic examination showed enlargement of the heart, resolving pneumonia in the right upper lobe, bilateral hydrothorax, and a questionable pericardial adhesion just below the inferior border of the eighth posterior rib. An electrocardiogram (Fig. 1) revealed a sinus tachycardia, normal conduction intervals, and T waves that were abnormal in that they were low and broad in Lead I, diphasic in Lead II, and inverted in Lead III. The total serum proteins were 4.6 mg. per cent, with albumin 2.8 and globulin 1.8 mg. per cent. The nonprotein nitrogen was 47 mg. per cent, and the blood sugar was normal.

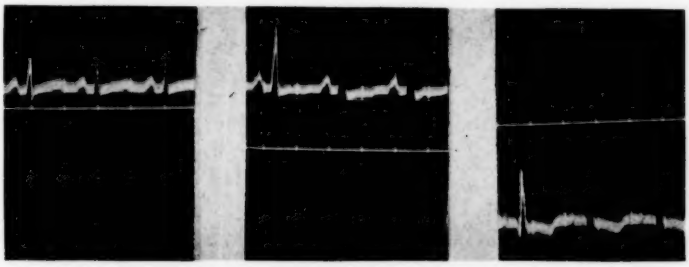

Fig. 1.—Three leads of electrocardiogram made March 10, 1937.

The impression on admission was that the patient had cardiac disease (possibly a postpneumonic myocarditis with cardiac failure and passive congestion), Pick's disease, or hepatic cirrhosis with nutritional edema.

Course.—Digitalis was started immediately, 0.4 Gm. being given between March 8 and March 10, and 0.85 Gm. between March 13 and March 20. Glucose, 50 per cent, and urea, 40 per cent, as well as salyrgan, produced diuresis each time they were administered, but the effect upon the edema was slight and transient. Transfusions and supportive treatment were given as indicated. A pericardial effusion developed shortly after admission, and the venous pressure at the right wrist was elevated to 22.5 cm. water.

During the third week of hospitalization, there was a definite increase in the size and tenseness of the abdomen, and dependent edema of the lumbar region developed. By abdominal paracentesis, 500 c.c. yellow green fluid were removed. Its specific gravity was 1.014, and total proteins were 2.89 mg. per cent; there were eight lymphocytes and no organisms. The antifibrinolysin test was now normal, and the total serum proteins had risen to 5.7 mg. per cent, with albumin 3.3 and globulin 2.4 mg. per cent. The blood picture had not changed essentially.

Because of known contact with a tuberculous person, a tuberculous pericarditis was considered, but the Mantoux test, worked up to 0.1 mg. on four occasions and to 1 mg. on two occasions, was, at best, equivocal. Gastric contents also were negative for acid-fast bacilli.

During April and the first half of May, the child's condition was essentially unchanged. The weight increased until a maximum of 9,920 Gm. was reached on May 12, and the abdomen measured 63 cm. at its greatest circumference, as compared with 9,100 Gm. and 56 cm. a month previously. The total serum proteins were still below normal; the nonprotein nitrogen had dropped to 38 mg. per cent.

Digitalis was tried again on May 14 and discontinued on May 24 after a total of 1.15 Gm. had been given. During this period a marked improvement took place.

The weight dropped to 7,570 Gm., and the circumference of the abdomen decreased to 53 cm. As the edema disappeared, it became apparent that malnutrition existed in a moderate degree. There was a noticeable improvement in the blood chemistry: total proteins, 6.7, albumin, 3.6, globulin, 3.1, and nonprotein nitrogen, 27 mg. per cent.

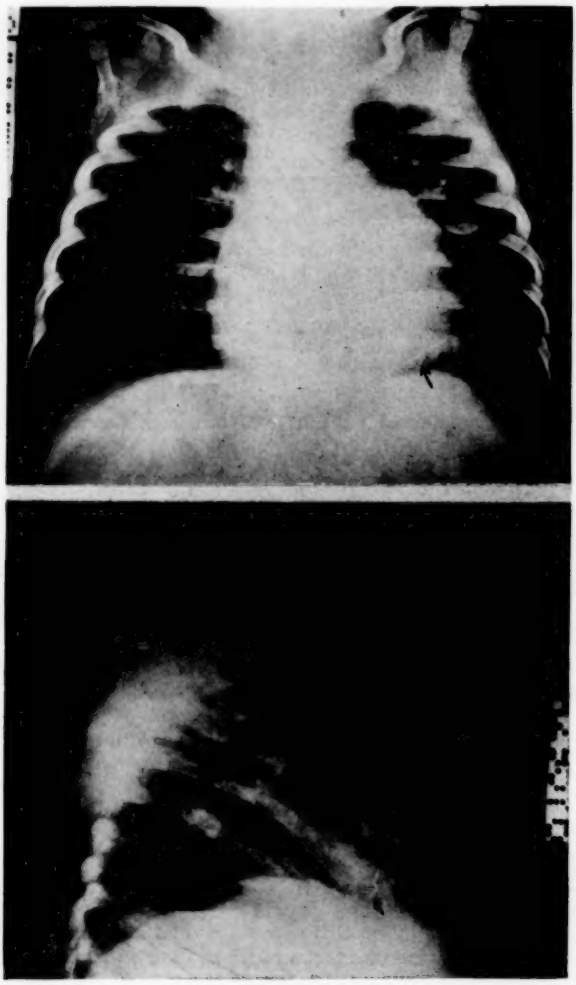

Fig. 2.—Roentgenograms made May 25, 1937, showing an opaque body within the cardiac shadow.

A routine film of the chest (Fig. 2) on May 25 showed a linear shadow of increased density 1.5 cm. in length and less than 1 mm. in diameter, apparently lying within the cardiac shadow and interpreted as a foreign body in the substance of the heart. In reviewing the previous films, the same shadow could be seen in all of them, but there had been a definite change in its position from just

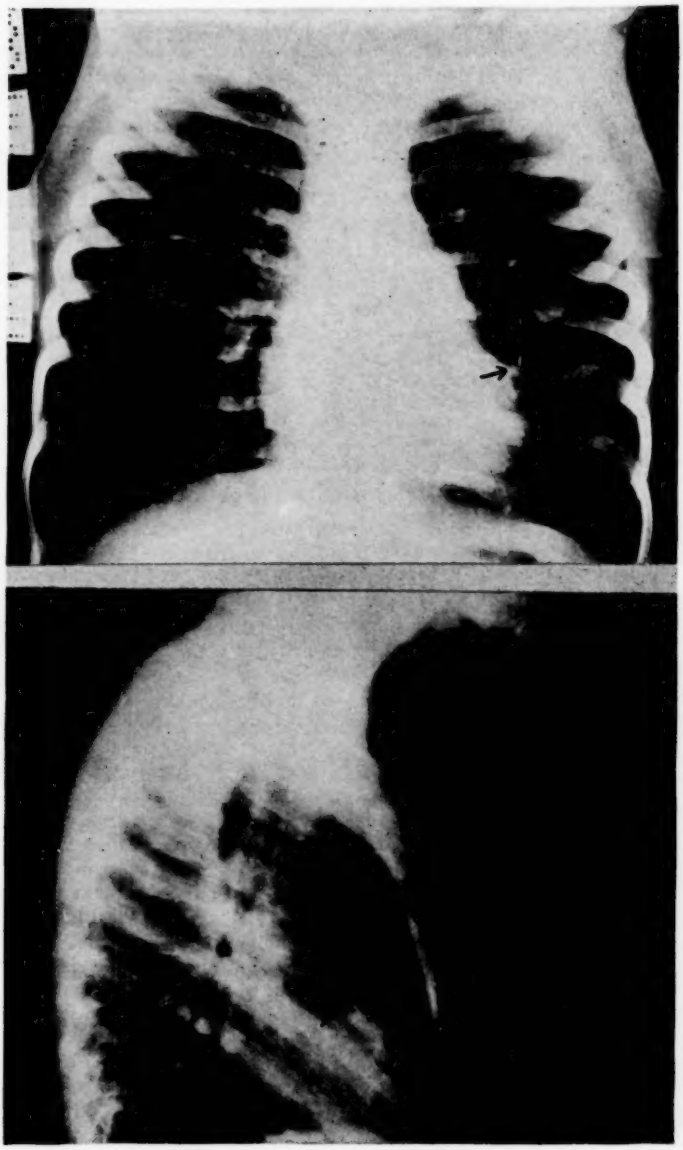

Fig. 3.—Roentgenograms made Aug. 4, 1939. The opaque body is now in the lung field.

above the diaphragm to the lateral border of the heart. After a surgical consultation,* it was decided to treat the patient conservatively as long as the course remained satisfactory, and as long as there were no returning signs of cardiac dysfunction. Had symptoms of any complication, such as embolism, hemorrhage, or lung abscess, appeared at any time during the subsequent course, a surgical procedure would have been advised.

The patient improved steadily and was discharged on the one hundredth day of hospitalization. The temperature and pulse were normal; the appetite was good, and the weight was 7,550 Gm. There was no cardiac enlargement or murmur, and the pericardial effusion had disappeared entirely. Both the liver and spleen could be felt 1 cm. below the costal margin.

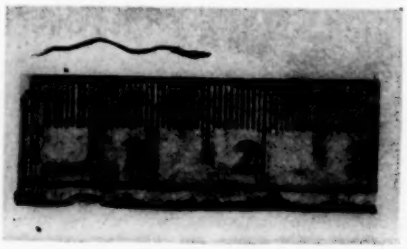

Fig. 4.—Photograph of the wire coughed up Dec. 15, 1939.

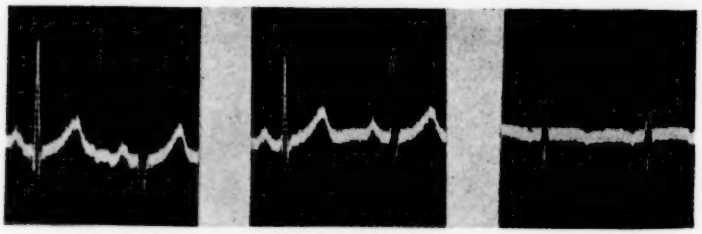

Fig. 5.—Three leads of electrocardiogram made Dec. 18, 1939.

The child was examined in the outpatient clinic at frequent intervals. On Aug. 4, 1939, a chest film (Fig. 3) showed that the opaque body was now in the lung shadow of the left upper lobe, posterior to the pericardium between the seventh and eighth posterior ribs. On Dec. 14, 1939, the patient seemed particularly quiet and subdued and vomited once. The next morning she coughed up an old blood clot and with it a piece of corroded wire measuring 1.5 cm. in length by 0.6 mm. in diameter (Fig. 4). This was assumed to be the foreign body, and failure to show the previously observed shadow in the roentgenogram confirmed this impression. At no time after discharge from the hospital were there any complaints, symptoms, or abnormal physical findings. By this time, the electrocardiogram (Fig. 5) was normal except for a slight left axis deviation.

COMMENT

It is fairly certain that the portal of entry of the foreign body was through the esophagus. The patient's mother admitted using an old

*In addition, a summary of the case was presented to two nationally known surgeons with wide experience in the cardiac field. One recommended operation; the other advised against it.

wire strainer for puréeing vegetables, and she volunteered the information that occasionally small pieces had broken off. It is supposed that this was the source of the foreign body and that the wire penetrated the esophagus and entered the heart, after first producing a periesophagitis and a basal pneumonitis at the time that the child had signs of a left lower lobe pneumonia. The object eventually migrated from the heart to the left upper lobe of the lung and was finally expelled spontaneously from the body more than thirty-three months after entry, leaving no residual impairment that could be found either on physical examination or by electrocardiogram.

At the time that a diagnosis of a foreign body in the heart was made, the child had already started to improve, the edema was decreasing, the pulse was slower, the temperature was normal, and the appetite was better; therefore, it was decided not to interfere surgically. Until then, for two and one-half months, the patient had run an unpredictable course, with the temperature remaining elevated at about 38° C., with an occasional rise to 39° for the first month, and between 37° and 38° for the next month. The edema and ascites were benefited only temporarily, if at all, by the drugs given. Once begun, improvement was steady, with no return of symptoms for the duration of the observation period of thirty-four months.

Those who saw the child during the early part of her illness believed that she was suffering from a cardiac condition, most likely a chronic constrictive pericarditis, and that eventually cardiolysis would have to be performed. In favor of this diagnosis were the minimal heart findings, the ascites, the pleural effusion, the increased venous pressure, and the large liver. The low total serum proteins, reflected chiefly in the low albumin, were attributed to the malnutrition. No adequate explanation was offered for the slight elevation of the nonprotein nitrogen.

A foreign body in the heart does not always produce cardiac symptoms, and its presence may not even be suspected during the lifetime of the patient. Meyer-Pantin[4] separated cases of foreign bodies in the heart into two groups: (1) cases in which death occurs within a few hours or days and in which there is severe cardiac injury with accompanying symptoms, such as a sense of precordial oppression, weak and irregular pulse, cyanosis, and other signs of asphyxia; and (2) cases in which the foreign body becomes embedded in the heart muscle and does not produce immediate cardiac symptoms. In the latter group, the patients may eventually develop cardiac damage and die from the results of the injury, or they may die from some other unrelated cause months or years after the accident. When early death occurs, it is usually due to hemorrhage, with or without tamponade. Secondary infections of the pericardium, lungs, or mediastinum account for many more of the deaths.

In Meyer-Pantin's series[4] of twenty-two cases of a needle as the foreign body in the heart, there were twelve cases in which the foreign body was the immediate cause of death, and ten cases in which it was an unexpected finding at autopsy. In the patients of the latter group, symptoms of heart damage were absent or minimal although the needle lay in the wall of the left ventricle five times, in the wall of the right ventricle twice, and in both ventricles once; the location is not given for the other two cases.

Risel[5] reported the case of a woman who died of a strangulated hernia. At autopsy three needle fragments were found in the anterior wall of the right ventricle. There had never been symptoms referable to the heart. History revealed that fifteen years before, the patient had attempted suicide by swallowing needles, and it was believed that this was the source of the foreign bodies.

The case of a child in whom a needle was found free in the left ventricle at autopsy was reported by Northrup[6] in 1913. The needle had entered by accident just below the ensiform cartilage fifteen months prior to death from pneumonia. Symptoms consisted of "heaviness of the chest" and paleness. The original diagnosis had been congenital heart disease without cyanosis.

Decker[3] mentions Cutler's patient who remained symptom-free with a bullet in the pericardium for fifty-two years, and Mott's case in which a needle was present in the interventricular septum for twenty-nine years without causing symptoms.

Petersen's[7] and Fair's[8] cases similarly illustrate the remarkable tolerance for foreign bodies exhibited by the heart.

A foreign body may reach the heart by three routes: (1) through the respiratory tract; (2) through the esophagus; and (3) through penetration of the body surface at any point. Entrance through the respiratory tract is most unusual, Meyer-Pantin[4] mentioning only one case in his report. There have been a few instances where entry was through the esophagus, but in the majority of cases it is through the chest wall. It is well known that foreign bodies, particularly needles, can migrate long distances in the tissues of the human body. In Rea and Hoover's case[9] it was believed that a needle found in the heart at autopsy had originally entered through the sole of the foot. Occasionally, bullets have reached the heart from a distant wound in the abdomen, thigh, or extremity by way of the great veins. Decker[3] mentions several such cases.

According to Elkin,[10] the first attempt to suture the human heart was made by Cappelan in 1895. Since then the surgical treatment of traumatic cardiac wounds has been reported with increasing frequency. The estimated mortality in all types of surgically treated heart wounds is about 30 per cent. The results in the foreign body group alone are more gratifying, Decker[3] stating the postoperative mor-

tality as 17 per cent in forty-seven operated cases. Infection ranked first as the cause of death in this latter group, with hemorrhage next.

Whether operation for removal of foreign bodies should be attempted depends upon the location and type of the object and upon the clinical appearance of the patient. It is generally agreed that early removal is indicated if the object lies free in a heart chamber or if it is long, thin, or sharp, in the one case because of the danger of embolism and in the other because of the possibility of penetration of the heart wall and subsequent death from hemorrhage. When there are grave symptoms, such as cardiac pain, suffocating crisis, and palpitation, immediate operation should be considered seriously. Decker concluded that, on the basis of statistics alone, one can argue neither for nor against operation.

SUMMARY

An unusual case of a piece of wire retained in the heart for at least twenty-nine months and in the lung for four more months, and then expelled spontaneously from the body, has been reported.

A review of the literature has failed to reveal a similar case.

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Panel Discussion on the Physical and Psychologic Disturbances of Adolescence

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Bert T. Beverly, M.D., Chicago, Ill.
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DR. MITCHELL.—The pediatrician is manifesting not only an increasing interest, but also an increasing activity, in the progress of adolescence. He has the background, and he knows what has happened to the child before; who better than he can carry the child through this particular period in which there are such profound physical and emotional changes?

Adolescence isn't a particularly easy period of life, as one watches its evolution. It begins at birth and lasts at least 21 years. At this particular period of life, he begins to manifest a certain amount of independence and self-reliance, without having the necessary background to carry through with his ambitions. The adolescent has considerable difficulty in adjusting himself, and parents constantly compromise between too strict discipline and no discipline at all. As the child grows older, his contacts in the community are constantly increasing; many more people enter into these contacts and into his environment. Our main object should be to get the child through childhood and through adolescence so that he can function ethically in, and be fair to, the community.

DR. VEEDER.—As the first speaker, it might be best to discuss adolescence from a rather broad standpoint. First of all, we have to get rid of the idea of many parents, and occasionally of physicians, that adolescence is a sort of disease. It is not a disease; it is a normal, natural, physiologic period of growth which everyone goes through. The question comes up immediately, "Why, if it is a perfectly natural period of growth, do we have so many troubles and problems with it?" This change that takes place is not simply a question of physical growth, although the rapid growth in size and muscular development does lead to problems. It is not simply a question of sex; I think sex is entirely overdone in any discussion of the adolescent. But there is also a tremendous change or growth in the emotional development, in the intellectual development, and in the psychologic attributes of the individual at this time.

If we look upon adolescence as an inherent biologic urge for independence, we have a starting point. You know that earlier childhood is a period of protection,

that the child wants and demands security, and that he has his troubles and problems just as the adult does, if he does not have security. Now then, something takes place within this child which is purely biologic and which urges him out to an independent place in the world. That would be all right, perhaps, if he were able to make his place independently. We wouldn't have many problems if it were not for the fact that the child is thwarted on every side by what, for lack of a better term, may be termed environment. I don't mean by environment only his immediate living conditions. I mean by environment such matters as sex, for we can look upon that as an environmental problem. We could also include religion and economic conditions (which are very important factors), and we must include a great deal of the child's earlier training and conditioning. This conflict in the adolescent between the urge from within and the hedged-in stone wall on which he jams his head in every direction is the situation that causes trouble.

DR. MITCHELL.—You started out by saying that adolescence was normal and now you speak of the adolescent conflict. Where does this conflict come from? Is it from the outside?

DR. VEEDER.—The conflict comes from the outside. It comes from what we call environment or largely from our so-called civilization, from taboos, customs, manners. In other words, the problem of sex such as we have here in the United States would not arise in the adolescent who was going through this period of life in an African tribe because the morals and the customs are entirely different. Here's the sex problem in a nutshell. A child reaches sexual maturity and development during his adolescent period, but because of economic conditions, because of religion, because of social customs, he cannot fulfill his normal functions. The family is the basis of our civilization and society, and since he cannot support a family, he must restrain or put aside this perfectly normal sex urge.

One of the most difficult problems we encounter today in the adolescent, and one against which he hits his head the hardest, is the economic problem. For a person to be independent, as the adolescent desires to be, he must either have an income of his own, or, in probably 999 cases out of a 1,000, he must earn his own living. He cannot have independence unless he has economic independence, and we all know how difficult it is for any young man or woman to earn his living and become independent. When we think, for example, of the girl who, at 14 or 15 years of age, works in the store or a shop to add to the family income in an attempt to work out an economic independent existence, we realize she cannot do it. Can you blame that girl for wanting the amusement that she sees lots of other people having? Can you blame her at all for wanting to go out at night and to the movies? It is when the parents, because of their training, object to that sort of thing that the conflicts arise. Religion also causes a great deal of conflict. Furthermore, the overstrain in the adolescent is a result of our way of living which is thrown upon him. He not only may undergo the strain of athletic competition, but he may encounter the strain of arduous schoolwork and much social activity. An adolescent child today could tell you almost three weeks ahead of time exactly what he is going to do at a given hour. I do not believe from the physical side that any one thing alone ever has hurt a child—athletics, schoolwork, or outside activity—but it's the combination of them in our modern way of living, and I mean by that, environment, which throws a strain upon the adolescent and frequently leads to a physical breakdown. Another reason, of course, is that the child inherits different qualities and abilities. We talk so much about the endocrine glands and their influence on growth, and we must recognize that there are children who are handicapped by factors which they have inherited. So we must remember that on every side the adolescent is impeded in the direction of expressing his

independence and that he continually hits his head against a wall. Eventually, of course, the vast majority of children give in. I think that is the end of the adolescent period for most of them; they simply cannot stand it any longer, and they adjust themselves to the conditions in which they are living. Some, unfortunately, don't do that soon enough, and some do not do it at all. They are unwilling to give in, and some of them sidetrack by going out into paths of unreality; they get away from the strain of life by turning over into the schizophrenic state, and, of course, it is not uncommon in adolescence to have this conflict become so severe that it may even end in suicide. In other words, they cannot stand the strain of butting their heads against this wall of environment, using that term in a broad sense.

Now, having a conception of the problem as I have described it, our experience has been that we could translate nearly all of the peculiar individual problems that come to us. Certainly this conception has been a great aid to us in attempting to have parents understand the problems and their cause.

DR. MITCHELL.—You have brought out some problems, and perhaps later we will get to more specific solutions of them. Perhaps you might tell us, after Dr. Beverly has talked, how much we, as pediatricians, can help in this particular job in our contact with parents. As you brought out, the problem is much beyond the scope of the family as the child grows older; he has all sorts of contacts in the neighborhood, in church, in school, and with his companions, and problems do arise. Is our job to help the parents do this, or is our job to help the adolescent himself to do it? We ought somehow to give an answer to these questions if we can.

DR. BEVERLY.—As emphasized by Dr. Veeder, adolescence is a period of growth, and like any period it has characteristics peculiar to growth as a whole and presents features limited to that span of life. Adolescence is ushered in by the physiologic changes incident to puberty. Biologically, it begins with puberty; emotionally, its chief sign is the marked exaggeration of sex impulses and the development of sex attraction. When an individual reaches this stage of growth, he sees himself as others see him for the first time. For the first time in his life he becomes conscious of social norms and standards. Until a youngster reaches this age, he is not especially concerned about what anyone thinks of him. At this time, however, he becomes acutely interested in the impression he makes. We see then that, socially, adolescence is the period during which the little savages grow up and learn to act like adults and acquire adult attitudes and viewpoints. In this process of growing up, however, many problems present themselves to the adolescent. The solution of those problems is necessary for successful living. In briefly describing these problems, I would like to emphasize that the degree of their seriousness depends upon early training. Until a child reaches adolescence he can be reared by almost any method which suits the fancy of his parents and he will probably get along all right. That is to say, he will get along all right until he reaches adolescence, but from this period on, the effects of the various methods of rearing will manifest themselves.

The first problem that confronts the adolescent is sex adjustment. Adolescence is characterized by a marked exaggeration of sex impulses and the development of sex attraction. During this period of life sex impulses are stronger than at any other age, and, perhaps differing from Dr. Veeder, I believe sex problems are important in the minds of boys and girls at this time. Also, the seriousness of these problems depends upon the attitude of parents toward the subject and upon the kind of teaching children have received. The ease with which a youngster makes an adjustment on a sex basis depends upon how much he has been scared, confused, and kept uninformed on sex matters during his childhood. If he has had

no instruction, or if he has been convinced that everything pertaining to this important aspect of life is bad, dirty, and wicked, he is going to have a more difficult time than if he has had accurate information given by persons with unprejudiced attitudes.

Another problem which is important in the adolescent mind was described by Dr. Veeder, namely, independence. It was expressed by a very intelligent 12-year-old boy who said to his father, "Pop, you know I am grown up. From now on I am going to do just exactly as I please, and you or nobody else can make me do otherwise. Now what are you going to do about it?" He was laughing as he made these remarks. Back of that superficial display of humor, one should see the determination of all his ancestry. Independence is sometimes more important than anything else, and boys and girls are willing to go to great lengths to get it. There is, however, a corollary to the problem of independence. It was brought out very well when the father of the above boy answered in the following way: "Fine. You are grown up and you can do as you please. I can't make you do things and have no desire to do so. In fact, this is a relief because when you were younger I felt responsible for you, but now I am relieved of that worry." The boy replied, "Yes, but I have the right to come to you for advice." We see in the attitude of this boy, first, his desire for independence, but once he is assured of independence, he expresses his dependence. As pointed out by Dr. Veeder, boys and girls of this age are confronted with a great many social problems. Future occupation, the opposite sex, religion, and social demands are a few of the questions before them. They do not have sufficient self-reliance or self-confidence to solve their problems alone. They often want someone in whom they have confidence and with whom they can "talk over" their problems. It is true that adolescents sometimes demand their independence or take their independence and then get into serious difficulties. The reason is obvious. Those youngsters who get into difficulties have not been given sufficient security and confidence by their parents. They have not been allowed to grow up and develop self-reliance; they have been kept under father's thumb or tied to mother's apron string. We see, therefore, that the seriousness of this problem depends upon early training.

The third problem which occurs in the mind of the adolescent is related to the first two and has to do with weaning. At the age of adolescence the youngster must give up his marked attachment for parents (or opposite parent) and transfer his affection to the opposite sex. An adjustment on a heterosexual basis is essential to happy living. Those boys and girls who are allowed to become self-reliant during the period when they are growing up slowly become "weaned" and have little difficulty in becoming emancipated from their parents at adolescence.

The fourth problem found in the adolescent mind has to do with feelings of inferiority. A child can be told he is bad and no good from fifteen to twenty times a day (and a large percentage of children are told they are bad that often) and still get along pretty well. It does not seem to make much difference until he reaches that period of life at which he sees himself as others see him. At that time, if he is convinced he is bad and no good, he will feel that everyone else thinks the same thing. These feelings of inferiority cause untold unhappiness to adolescents. Fear of failure is a common reason for not putting forth the effort to do what they are capable of doing.

I believe the four problems which have been described briefly are found in the mind of every adolescent boy and girl. They vary in degree, depending upon early training. In addition to these general problems, there are many individual problems which depend upon the individual experiences of each child. We will not take the time to discuss them, because they vary greatly and cannot be satisfactorily classified. A boy or girl, then, with given physical and intellectual

characteristics, as well as given emotional attributes, attempts to adjust himself to the environment in which he finds himself. It is obvious that success is a variable. It has been stated by many authorities, and denied by no one, that only a small percentage of individuals are completely successful in making a very good adjustment. Some persons are temporarily successful; they get along fairly well during adolescence, but develop psychologic maladjustments later in life. Some boys and girls have problems so complicated that they cannot make an adjustment during adolescence. They make up the so-called adolescent problem children. This is the way I would summarize some of the emotional problems of this age group, Mr. Chairman.

DR. VEEDER.—Dr. Beverly, either you misunderstood me or I did not express myself correctly. I did not say that the sex problems were not real problems. I said I felt that in the whole subject of adolescence the problem of sex was overemphasized. Far be it from me to believe or even to state that sex problems do not form one of the real problems. Now I'd like to ask you a question. Do you believe that the normal average child has any particular interest in sex before the beginning of adolescence?

DR. BEVERLY.—Yes.

DR. VEEDER.—I don't; I believe that until adolescence is reached there is no particular interest in sex. What we hear about an early "interest" comes from those whom we slangily call "sexy persons." It is my feeling that a great deal of this so-called interest in sex in early childhood, which has been stressed so much, has considerable bunkum and hokum about it. Much of the so-called sex problem is simply curiosity.

DR. BEVERLY.—It may be that we are talking about the same thing in a different way. Curiosity is one of the important characteristics of the human mind; it is the basis for all learning. Young children are first curious about themselves, their own bodies, etc. I consider that is sex interest. Furthermore, if you observe children in such a way that they will not know they are being watched, I believe you will find that sex commonly occupies their minds and influences their play.

DR. VEEDER.—Yes, most of us agree that's one of the sex problems of adolescence.

DR. MITCHELL.—Is this an anatomic problem? Do you mean the wondering about the physical difference between the sexes?

DR. BEVERLY.—The difference between sexes (anatomically) is one thing that arouses their interest, but the subject is much broader than that. In sex we are dealing with one phase of emotional growth. It represents one of the potentialities for development which is present at birth. The patterns slowly unfold themselves during childhood with a marked exaggeration at adolescence. I believe you will further agree that sex problems are complicated in children's minds by the unnecessary scaring on the subject by parents and adults in general.

DR. MITCHELL.—There seems to be one point which both of these participants have stressed so far and about which I believe there could be some discussion; namely, that what the adolescent is beginning to do is to search for and to demand independence. But somehow the real difficulty appears to be that, while he wants independence, he is not yet capable of functioning independently, and that is where the great problem arises for the parent or the pediatrician. Dr. Beverly brought out this fact very well. Admit to the adolescent that he has a right to be independent, but that he can come to you for advice without constant nagging and

telling him what he has to do—that is the advice the physician should give to parents. Our real problem is that most parents do not understand these particular normal adolescent reactions. They are still hanging on to the period when their children are dependent on them, and they hate to give it up. Can we help; is it our job to help in this type of education? It appears that, while the adolescent wants independence, he simply cannot afford to ask for advice in the same way and from the people from whom he received that advice when he was younger. An entirely different situation is created. If a curfew is instituted, it makes no difference whether he has to come in at 9 P.M. or 2 A.M.; it's the fact that you demand that he arrive home at a specific time. We must somehow get over to the adolescent the idea that he can still come for advice, but that he will get it in a different way, that is, with a recognition that he is coming for advice and not that certain things will be told him that he must do. Is all this a fair statement of the problem?

DR. VEEDER.—Don't you think one of the commonest faults is lack of proper parental attitude toward boys? Suddenly the father realizes that his boy has grown up and that he is getting into difficulties. Then the father tries to make friends with his son, although he ignored him entirely before. It is a pathetic thing to see a father try to deal with a boy of 15 or 16 when he doesn't know the boy at all, never having played with him and having lived a life entirely apart from him; then he tries to give that boy advice when he has had no previous friendly relationship with him.

DR. MITCHELL.—Yes, I think you're right. What has happened before adolescence then becomes important, and therefore education of the parents in the care of the adolescent and his problems must be started long before adolescence. Isn't that the idea?

DR. BEVERLY.—Yes. If one is to prepare children for adolescence one must begin at the birth of the child and recognize the importance of the attitudes of parents toward the child. If parents are entirely satisfied with their children, thereby giving them security and confidence, and if they allow the children to develop self-reliance, much of the serious rebellion at adolescence would be prevented. Parents can make their children feel they are entirely satisfied with them and at the same time make the children feel there are some things they must do.

DR. MITCHELL.—I have always thought that one of the great difficulties—as I mentioned briefly in the prologue—is the inconsistency of parents. At one time they will institute a number of rules and be severe and insistent, and the next week they will relax all rules. It must be very confusing to the adolescent to live under such a regime as that.

DR. JOHNSTON.—I should like to review in about six minutes a few of the purely physical changes of the adolescent, and then some of the implications that go with these normal changes. I would first remind you that growth does not proceed in a straight line; it progresses in a series of S-shaped curves, with a period of slow growth followed by a spurt and that in turn, succeeded by a slowing down. The only one of these curves, with which we are concerned today is the third and final one, that of the adolescent period when a rapid growth in height and weight is followed by a gradual slowing and final cessation. The second point is that this growth is a function, not of chronologic age, but of physiologic age. Thus the patterns of growth of an 11-year-old and a 16-year-old girl will be similar if the onset of menstruation occurs in the first girl at 11 and in the second at 16. Data on metabolism and growth at this age period must be interpreted in terms of the physiologic rather than the chronologic age. This fact is well brought out in a chart from Shuttleworth where the increments of height per year are treated in this

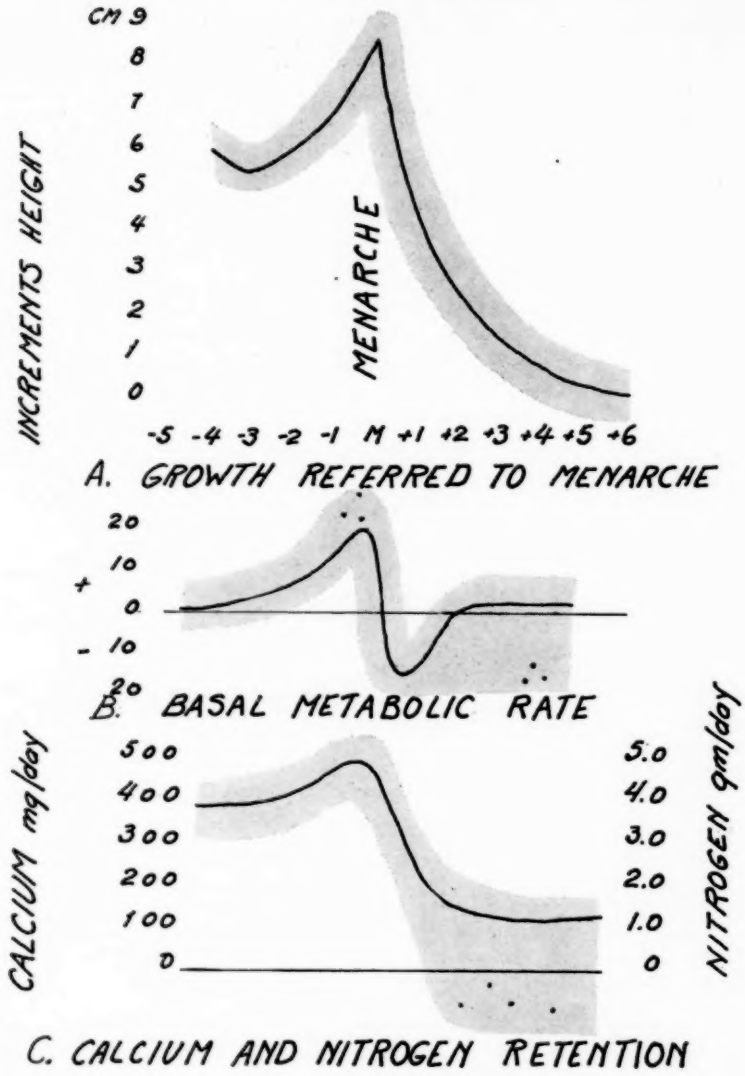

Chart 1.—Metabolism at puberty (schematic).

A, The dependence of the rate of growth on physiologic rather than chronologic age is brought out by a modification of the curves of Boas and Shuttleworth.

B, The basal metabolic rate shows a tendency to a prepuberty rise and a postmenarcheal fall. The dots indicate actual determinations to bring out that, while the usual fluctuation remains within physiologic bounds, this is not consistently true, and that there is to be expected a certain amount of pathologic acceleration preceding the menarche and, at least in the goiter belt where this was done, a large amount of postmenarcheal hypothyroidism which is symptomatic.

C, A depression of the retention of calcium and nitrogen at the time of the menarche may likewise reach the point of actual negative balance, and the physiologic trend be exaggerated by dietary and infectious factors.

fashion, showing a striking acceleration in the rate of growth appearing the year before the menarche, and an even more striking slowing of the rate during the two years following the onset of menses (Chart 1 *A*).

Chart 1 *B* is schematic and brings out two points. The basal metabolic rate shows a definite increase in the six months preceding the onset of menses paralleling the increased rate of growth, and following the menarche there is a depression in the rate.

This elevation of metabolism preceding the menarche and the depression following it, as has been stressed by others, are normal physiologic changes through which every normal girl does. The tendencies, however, frequently become pathologic and a number of the abnormalities of this period have their basis, we feel, in glandular changes evidencing themselves in exaggerations of both of these metabolic tendencies; in so far as they are exaggerations, they are pathologic and require treatment. My own experience is possibly colored by residence in the goiter belt, but I have seen a child obviously on the verge of the menarche with the frank signs of a toxic goiter—tremor, tachycardia, sweating, prominent eyes, and a basal metabolic rate of +29—who, with a week of bed rest and a course of iodine, had a critical fall in metabolism to normal and who menstruated then for the first time. I think that to have allowed this condition to go untreated, with the attitude that time would care for it, would be quite wrong. A similar case responded in an identical way when a bilateral antrum infection was cured. The elevation in metabolism which we have demonstrated elsewhere in connection with focal infection would not, in other age groups, have produced this picture, but added to the acceleration already produced by the puberty reaction, it resulted in a truly pathologic state. These cases represent a type which is not, however, nearly as common as that of girls in a group who, following the onset of menses, show a persistence of the lowered metabolism associated with that period. Dr. Pratt and I recently analyzed a group of girls coming to the clinic because of abnormalities in the menstrual cycle, and the number who showed lowered metabolic rates and whose symptoms disappeared with the administration of thyroid extract was striking. We are conscious of the fact that a regular cycle cannot be anticipated for about two years after the onset of the menarche, but these instances were too much outside the range of normal variation to be dismissed.

Paralleling the changes in the metabolic rate there occur a rise and fall in the retention of nitrogen and calcium. The fall in retention that coincides with the onset of menstruation is very striking (Chart 1 *C*), and it may be one factor undermining nutrition at this period.

Our particular interest in the point arose in the study of tuberculosis in children. Two-thirds of the cases of the reinfection type that were detected in the period of twelve years were in girls, and their occurrence centered sharply around the period of puberty. It is our thought that the puberty phenomenon itself is one of the factors inducing what Baldwin spoke of as "lowered vitality." With a normal balance and an adequate diet, the tendency to a depressed retention does not usually result in balances that are actually negative, but an exaggeration of the tendency or the superimposition of dietary defect at just this critical period may actually cause negative balances and, finally, spread of disease. In support of this idea we have observations on two children who were put in the hospital for a minimal reinfection type of tuberculosis. In both of these children a positive nitrogen balance at the start of the observation became negative coincidentally with a spread of the disease and with the onset of menstruation. Cause and effect of the menarche was a factor depressing retention and this negative phase of retention permitted spread of the disease.

I should like to stress the point that a lowering of the metabolic rate does not carry with it the conclusion that we are dealing with thyroid disease. We have reported elsewhere our studies on more than thirty children in whom we could secure

consistently lower metabolic rates with diets which were low in protein, and these rates could be brought to normal promptly with adequate diet. In those studies we stressed the point that the requirement for protein in the growth period was

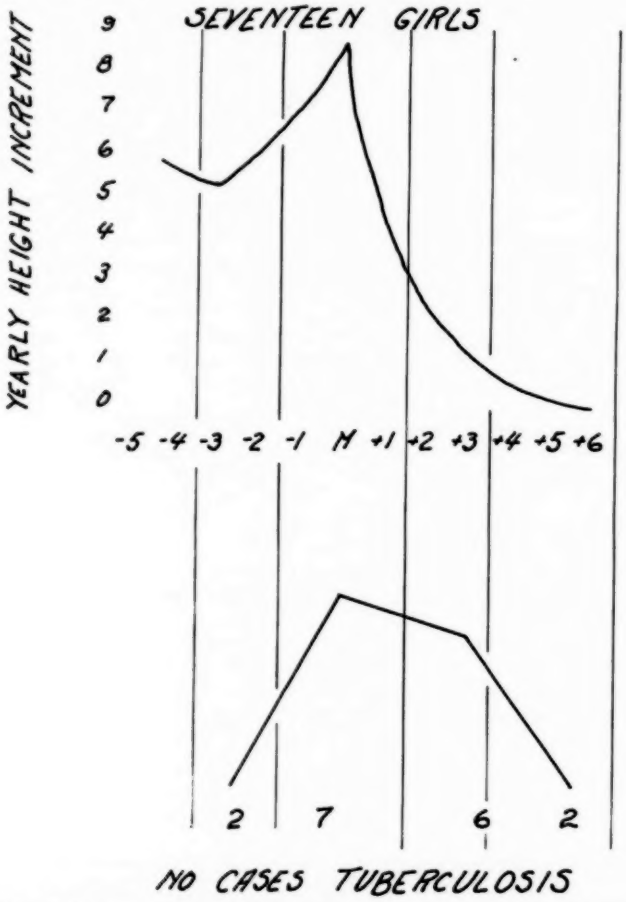

Chart 2.—Endogenous tuberculosis at puberty. The age incidence of apparently endogenous tuberculous reinfection in seventeen girls among more than 800 girls. These seventeen were followed after their removal from original contact. The chart was plotted in terms of their physiologic age and against their growth rates, suggesting that in this small group there was an association with puberty. They had been followed for varying periods up to twelve years.

15 per cent of an adequate caloric intake. This fact brings out the point of the very high requirement for protein at this age. I think that the protein requirement when growth is finished is of almost purely academic interest, but the requirement has very practical importance at this age. In connection with the study of menstrual difficulties to which I referred above, it was our feeling that some of the incidents of depressed metabolism were secondary to an inadequate intake of both calories and protein, and we had one striking example of a child whose symptoms were merely aggravated by thyroid, but whose amenorrhea disappeared on

a high caloric diet. The actual protein items in a diet containing 125 Gm. are illustrated in a slide which brings out the fact that it was necessary to include an appreciable quantity of animal protein at each of the three meals to satisfy this.

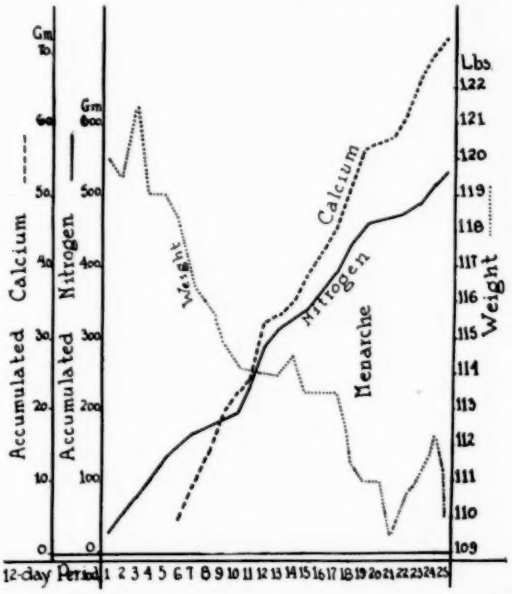

Chart 3.—Reproduction of chart (Am. J. Dis. Child. 59: 287, 1940) to show that it was possible to effect weight loss in an adolescent while promoting retention of calcium and nitrogen. This brings out the point that there is not necessarily inherent in the weight reduction program any depletion of the stores of these items, provided the intake is adequate.

In the case of this 11-year-old negro girl, the caloric intake was 1,900 calories, the protein intake, 80 Gm., and the calcium intake, 1.2 Gm. The basal metabolic rate, by the Talbot height standard, varied from +12 in the premenarcheal rise to −16 following the onset of menses.

DR. BEVERLY.—As pointed out by Dr. Johnston, the time of onset of puberty varies over a period of five years. We commonly see girls with psychologic maladjustments because the beginning of adolescence is very early or very late, especially those girls who do not menstruate until they are over 16 years of age. Their emotional development is delayed correspondingly; they lose their friends, feel they are different, and usually become very unhappy. Assuming that their basal metabolism and blood chemistry are normal, can one safely do anything to hasten their maturation?

DR. JOHNSTON.—Before I answer that question, I would like to read this short statement sent by Dr. Pratt. He says: "What I wish to emphasize most of all is that the care of the individual as a whole during childhood and adolescence is the best treatment for endocrine disturbances. It is my impression that one frequently sees the late onset of menstruation, irregularity, and scanty flow in girls who show evidence of having had a form of pituitary disturbance."

DR. MITCHELL.—Of course, we do not have here the evidence which leads Dr. Pratt to think they had a form of pituitary disturbance. I'm a little confused about the statement that it took twenty-six menstrual periods before they became regular and well established. How are you going to tell in the meantime whether

this is the average? That is, there must be wide limits of what we can except as normal. How are we going to tell in the individual girl what is abnormal in this function?

DR. JOHNSTON.—I wouldn't want to misquote Dr. Pratt, but he would doubt if the interval ever does become fixed and regular except in a minor percentage of women. He has tried to keep records on his adult practice; the scatter is amazing, and it would take a good deal of statistical juggling to decide that there was any such thing as a perfectly regular cycle.

DR. MITCHELL.—That indicates that we should be a bit careful in carrying out any particular type of treatment or regime to make something regular which may continue to be irregular in an apparently normal person. Is that right?

DR. JOHNSTON.—That's what has made me so skeptical about the efficacy of the various hormone preparations. Dr. Pratt controlled his study of a good many of them by the use of distilled water in alternate cases, and he found that there was about as much effect with distilled water in many cases as was received with a variety of hormone preparations.

Dr. Pratt goes on to say: "This menstrual difficulty may occur in girls who show evidence of having a form of pituitary disturbance; the dysfunction has been present in years past, and frequently the aberration of the function of the pituitary gland has ceased, and at the time the individual is seen for a disturbance of menstruation, no pituitary dysfunction can be demonstrated. Examination of the ovaries shows that they are normal, but their function has been retarded by the former dysfunction of the pituitary. It seems that pediatricians, therefore, can do a great service in anticipating these menstrual disorders of adolescence by care of the individual as a whole in the earlier years. The second point to be emphasized is that a primary deficiency of the ovaries during adolescence is relatively rare, and that, of all the glandular preparations which may be used for correction or dysfunction of the ovaries, thyroid extract is pre-eminent. More has been accomplished by the administration of thyroid extract in correcting menstrual irregularities than by the use of all other glandular preparations put together."

DR. MITCHELL.—How should we proceed to find out whether we should use thyroid extract in an individual case; by basal metabolic studies?

DR. JOHNSTON.—The basal metabolic rate is one method, but it ought to be interpreted with a good deal of judgment concerning what constitutes variation from the normal. I mean that one ought to have in mind this rhythmic change occurring in the pre- and postpuberty period; second, one ought to have some other manifestations of hypo- or hyperthyroidism to go with it. Given a child whose metabolic rate is equivocal, the presence of a low blood pressure, secondary anemia, symptoms of fatigue, and all this despite an adequate diet and normal regime, the impression that hypothyroidism existed would be reasonable and the use of thyroid extract indicated. On the other hand, the presence of only a slight lowering of the metabolic rate and the presence of an elevated blood pressure and nervousness would certainly prevent using it.

DR. VEEDER.—Do you not think that one of the more important disturbances of adolescence is anemia? Today we have almost dropped out of our textbooks the term chlorosis, or green sickness, to which chapters used to be devoted. It seems to me that, in the majority of the girls whom I see with these minor difficulties, nearly all improve with iron, perhaps, almost better than with any other therapy.

DR. JOHNSTON.—Iron or small doses of thyroid. If we find a secondary anemia for which there is no evident cause in the way of focal infection or inadequate diet, and if it is possible to do so, we nearly always determine the metabolic rate.

DR. MITCHELL.—I take it that in the discussion so far we agree that there are wide limits of normal, that is, that we must talk in averages, realizing that averages are broad bands and not just spots on a chart. We cannot say, for example, in a given community or climate, that if menstruation does not begin at such and such a time, abnormality necessarily exists. It is the individual study of the patient which may indicate whether anything is to be done or whether therapy should be instituted.

DR. JOHNSTON.—Apropos to that is the answer to a question that I heard being put to one of the candidates who was examined by the American Board of Pediatrics. The question was something like this: A 15-year-old girl came in with a history that she had started to menstruate at about 13½ years of age, but had never become quite regular; then she didn't have any periods for four or five months. What are you going to do?

DR. VEEDER.—That isn't quite the way the question was put. The question that I've often asked has been that, if a girl's mother comes in with the story that her child has had a menstrual period, and then three or four weeks later had another one, and then in three weeks, then in six weeks, then in three weeks, and none for seven or eight weeks, what would you do? If the answer is "Do nothing," or if the examinee doesn't know what to do and wouldn't do anything, the answer is correct. Unfortunately a few candidates have told me that they would make a complete physical examination, and they then were asked, "How complete?" Well, yes, they would do a vaginal examination. In that case, the man fails because he might induce a severe psychic trauma in the child, and he is not fit to practice pediatrics from the viewpoint of a good many of us. Now someone may disagree with that, but I think that the danger of carrying out a procedure of that type is tremendous. Do you agree with that or not?

DR. JOHNSTON.—A recent experience of our own may be appropriate at this time. The mother of a 17-year-old girl phoned and asked me if I would see her daughter although she suspected that the child was beyond our usual age limit. She had had menstrual difficulty and had been to see an internist who, in turn, had consulted a gynecologist. With neither, however, had a desirable relationship been established, and the child was unwilling to discuss her troubles with them. She had three things the matter with her. She was attempting to maintain a rather vicious school schedule which involved getting up very early in the morning and being driven some distance to school by her father. Her haste at that time prevented her taking even a good average breakfast. Furthermore, there was no provision for exercise or outdoor activity. She showed a slight lowering of the metabolic rate and a secondary anemia, but in reviewing her diet, I felt that both of these would be corrected with an adequate amount of protein and did not, therefore, prescribe thyroid therapy.

DR. BEVERLY.—Is it safe, or is there anything to do to bring on menstruation in a 15-year-old girl who is becoming maladjusted socially because of her lack of emotional growth (which is on a physiologic basis), assuming that her metabolic rate and blood chemistry are normal?

DR. JOHNSTON.—May I read the next paragraph in Dr. Pratt's letter. He has this to say: "The lutein preparations and chorionic gonadotropic hormones are not indicated in disturbances of menstruation in the adolescent. Gonadotropic hormone in mare's serum is potent and does induce maturity of ovaries and may induce menstruation, but it should be used with extreme caution because experimental work has shown that it not only produces maturity of follicles, but also degeneration." Further with respect to that particular point, though we have been able to show with the estrogenic hormones a frank depression of the retention of calcium,

I think that, in the present state of our rather deep ignorance in this matter, the only safe thing we can do is to see at least that the metabolic rate approaches normal. If it is too elevated, a set of medical measures can be instituted which will tend to bring it back to normal. If it is too low, it can be brought up quite safely to normal with thyroid therapy, but I do not think we can safely induce it with estrogenic hormones.

DR. MITCHELL.—This large amount of protein which children need at this time in order to keep a positive nitrogen balance has impressed me. When one considers the number of adolescent girls who get the idea that they should do a bit of slimming—that is a very difficult situation to control, isn't it? These girls want to reduce in weight at a time when they ought to be taking a sufficient caloric intake and particularly a sufficient protein intake.

DR. JOHNSTON.—Before you ask Dr. Warkany to discuss obesity, I would like to point out that the two things are not incompatible; that is, you can induce a rather desirable slimming in children who tend to get obese, and yet maintain a positive nitrogen and calcium balance if you plan the diet adequately. I studied two adolescents in whom we induced from 6- to 10-pound weight losses while at the same time promoting active storage of nitrogen and calcium merely by increasing protein and calcium intake and reducing the carbohydrate and fat.

DR. WARKANY.—A discussion of physical disturbances of adolescence should include the problem of obesity, which is encountered frequently in children before and during puberty. In a period during which only five cases of diabetes insipidus were observed in our clinic, 140 cases of obesity were seen. The problem of the obesity of puberty is very confusing. Our difficulty starts with the question of nomenclature; the term "Fröhlich's syndrome" is often used, which is incorrect in the majority of cases. The Fröhlich syndrome consists of obesity, hypogenitalism, and symptoms of increased intracranial pressure. The prognosis and treatment of the Fröhlich syndrome which is caused by a tumor differs completely from that of the usual obesity of adolescence. In 140 cases of adolescent obesity

Fig. 1.

observed by us, there was not a single true Fröhlich syndrome. The term hypopituitarism which is often employed is also unsatisfactory. It has not been proved beyond doubt that a lack of pituitary function causes obesity. Furthermore, we know that hypofunction of the anterior pituitary causes retarded growth.

But obese adolescents are only rarely of small stature. Fig. 1 demonstrates that the majority of obese children are taller than the average and some of them are extremely tall, so much so that some people have suggested the term adiposogigantism to these children. This term, of course, does not apply to all of the children in this group, but for some the term of adiposogigantism would be quite appropriate. Since obesity is often associated with other abnormal findings, a number of syndromes have been established to emphasize the frequent combination of certain defects. Adiposogenital dystrophy is an excellent term for these cases of obesity in which hypogenitalism can be diagnosed; but it is well known that this diagnosis is not possible in every case, and particularly not in girls before puberty, so that this term also should be used with caution.

TABLE I

STUDY OF 140 OBESE CHILDREN (62 MALES; 78 FEMALES)

Hypogenitalism	44
Males	40
Females	4
Enlarged thyroid	12
Males	0
Females	12
Enlarged thymus in infancy	4
Males	2
Females	2
Diabetes mellitus	1

Table I shows that, of 140 children, forty-four showed signs of hypogenitalism, and, characteristically, forty of these were males and only four females. Now this is questionable too, because these four females were girls 14 years of age who had not yet menstruated, and, as you heard before, one cannot say that before 16 years lack of menstruation constitutes definite hypogenitalism.

DR. MITCHELL.—Do you think it is easier to diagnose hypogenitalism in a boy than a girl?

DR. WARKANY.—Yes. Twelve of these children had enlarged thyroid glands, and these twelve were girls. Now an enlarged thymus in infancy was mentioned in four cases, and there was one case of diabetes mellitus. Defects of the central nervous system or of the eye were stated to be present in about one-half of these children (Table II).

TABLE II

DEFECTS OF CENTRAL NERVOUS SYSTEM OR EYE IN 68 OF 140 OBESE CHILDREN

Mental retardation	32
Behavior problem	6
Speech defect	9
Convulsions	6
Chorea	9
Habit spasms	5
Hydrocephalus	3
Spina bifida	2
Eye defects	8
Strabismus	17
Nystagmus	5

Now we have here a great variety of abnormalities; out of 140 children, thirty-two were mentally retarded, six were behavior problems, nine had speech defects, nine had had chorea, and five had habit spasms. The eight eye defects listed were

all serious ones, such as microophthalmus, optic atrophy, etc.; but there was not a single case of retinitis pigmentosa among them. Therefore, the diagnosis of Laurence-Moon-Biedl syndrome was not made once in these 140 cases; there were, however, two partial Laurence-Moon-Biedl syndromes. Strabismus was frequent, and nystagmus was present in five cases.

TABLE III

STUDY OF 140 OBESE CHILDREN

Skeletal deformities	7
Epiphysiolysis	3
Enuresis	19

There were some other defects seen in these children; skeletal deformities of a more serious character were seen in seven, and epiphysiolysis, in three children. The high incidence of enuresis is surprising; it was present in nineteen children, and, of course, these were all children who did not have diabetes insipidus or diabetes mellitus; and they were not all mentally retarded. Some of them, in fact, had high intelligence; we are much puzzled by this high incidence of enuresis in these obese children, and I hope somebody can give us an idea of how this phenomenon can be explained.

This variety of associated findings and their combinations represent numerous syndromes, and it is hard to decide which combination should be given a special name and which should not. We think that in an individual case it is much better to state the symptoms independently instead of attaching the name of a syndrome incorrectly. We think so because, by attaching such a label to a child, certain prognostic and therapeutic prejudices are given.

We think this method preferable also because, at the present time, we treat not syndromes but symptoms. If tumor or syphilis can be excluded in a patient, we think that the obesity is best treated by diet. We were always a little worried about the diet at this age because we were afraid it could do some harm if it were given too long. But I was glad to hear that Dr. Johnston is of the opinion that a reducing diet is not of great danger so long as the protein content is sufficiently high; and naturally our reducing diets are usually low in carbohydrates and fat and high in protein.

We know that this treatment of obesity is not the ideal one and not the final one. We hope and we think that a hormone will be found which will influence obesity; but at the present time we do not have such a hormone, and it is better to admit frankly that the hormones that we give affect some associated findings of obesity but not the obesity itself. Gonadotropic hormones should be given in cases of cryptorchidism, and they will help in some of them; thyroid will help in patients with definite signs of hypothyroidism. We have the impression that the problem in many of these children is not purely an endocrine one. As a rule, we are dealing with children who show multiple developmental defects which probably include abnormalities of the hypothalamus and of some endocrine glands.

DR. JOHNSTON.—I should just like to emphasize one or two of the things you said. One was the question of thyroid in obesity. The very interesting studies of Hilda Bruche in New York indicate that, if one is going to take the metabolic rate as an indication for thyroid treatment, he will be constantly misled when the surface area is used as a measure in a fat person. Everybody recognizes that, but we haven't known what to do about it. But the average fat person around 13 years of age would show a metabolic rate that will be all the way from a −8 or −10 to a −15 or −20, depending upon how fat he is, and yet you all know that fatty tissue is distorting the picture because it enters into the calculation of the surface area. If you are going to have metabolism studies done on these

patients, and I think they should be done, they should be interpreted on the basis of height. With the height standard the rates for these children show a fairly consistent elevation.

The second point is of some interest clinically. Dr. Warkany has found three slipped epiphyses in his series, and, at the risk of saying this prematurely, I would like to point out one thing—fifty-five of these were reported some time ago from the Mayo Clinic and the distribution of the slipped epiphyses followed perfectly the pattern of sexual maturity. It was interesting that when the cases were divided by sex and the age incidence was plotted, the difference in the age incidence by sex corresponded roughly with the difference in the time of maturity in the two sexes. We recently studied two such cases for short periods and found a negative calcium balance, and in one case the balance was promptly made positive by the use of vitamin D. I think we badly need some more data on the D requirement at this age period; pending this I should strongly urge that the adolescent in the period of rapid growth get about the equivalent of one teaspoon of standard cod-liver oil daily. I would not leave with you the impression that we have any answer yet on the slipped epiphyses.

DR. MITCHELL.—I understand from your presentation that obesity is not an uncommon condition associated with general somatic growth, but that we should be careful not to correlate specific names with this obesity, such as, for example, stating that all of them are Fröhlich syndromes. But you certainly have shown by your illustration and tables that some of this obesity, at least, has to be regarded as abnormal when it is linked up to other types of somatic disturbances. Furthermore, you are convinced that there is a definite association of obesity with these other defects.

DR. JOHNSTON.—Yes.

DR. MITCHELL.—There is one phase that I would like to hear discussed further. The psychologic or even the psychiatric aspect of these children who are abnormal seems to me to be rather important. For instance, the fellow who is too fat usually gets into difficulty in a crowd; he is called "Fatty." The fellow who is too thin is called "Skinny." The fellow who has other types of physical abnormalities which are noticeable in the old swimming pool also gets into difficulty. These are problems which the physician cannot ignore. How can we take care of them? Could you give us some suggestions on that point, Dr. Beverly?

DR. BEVERLY.—There is one thing about the psychology of obese children which is very interesting. Dr. David Levy studied them carefully. Their behavior is characterized by a passive type of aggression. They do not fight, but ignore commands. Their behavior was illustrated by the case of an obese boy who was referred recently by an ophthalmologist. He had a severe and rapidly increasing myopia. The ophthalmologist was afraid that the boy's excessive reading would cause a detachment of the retina. The patient was reading from two to four hours a day after school. He promised to reduce the amount of reading and then proceeded to read as much as ever; he completely ignored all warnings. This type of boy is very difficult to manage.

DR. WARKANY.—I would like to say that children who are put on a 800 calorie a day diet often fight such a regimen.

DR. VEEDER.—You'll have trouble holding a child of that type to a strict diet.

DR. WARKANY.—Yes, we keep them on the diet only for from four to six weeks and have many tricks to secure their interest in their diet. Usually there is another member in the family who should also be dieting and who will usually play this game with them. The child is supposed to figure out the diet if he is

mentally normal, and in this way, good cooperation is often secured. In the period of four to six weeks, such children may lose 15 or 20 pounds if they really follow the diet, and after that they look so much more normal that they are usually grateful for the treatment. Of course, after a while they have to go back to a higher caloric intake, but often you will see that they do not eat as much as they did before. I do not maintain that this is an ideal treatment of obesity, but it helps and it sometimes assists these children in their psychologic problems.

DR. VEEDER.—Haven't you found in many of these obese children, particularly of the so-called pituitary types, that, if you do nothing, by the time they get along to 15 or 16 years of age they begin to thin out automatically? Just ignore them entirely? Certainly I don't believe in the use of endocrine therapy. I've found a good deal of help in putting such children on a "holding" diet, not a marked reducing diet; that is, let the child score his weight and follow that weight closely, twice a week, and eat anything he wants to eat provided he does not go above the weight at which he started, and then as he grows taller he automatically becomes thinner. I find it much easier to keep children on a diet like that than to put down a rigorous diet. Let them eat anything they want, but tell them that, if they exceed this line of weight, they must diet quite rigorously the next week until they lose weight. If they go below the line, they may eat to come back to it if they want to.

DR. JOHNSTON.—There is a good physiological point involved there that was emphasized a few years ago; there are many persons who are really hungry and distressed and anxious for food because of the nature of their carbohydrate metabolism. A good many of them represent examples of an overactive insulin mechanism. Their response to a carbohydrate diet is the production of hypoglycemic levels. Rather than attempting to offset this by intermediate carbohydrate, the logical thing to do would seem to be the use of a high protein diet, because, following a meal of hamburger, for example, the blood sugar curve showed no high levels, but no low levels; there was a smooth, even sustaining of the curve throughout a period of five hours.

DR. MITCHELL.—Has Dr. Warkany any figures on bone development in obesity?

DR. WARKANY.—We have done roentgenograms of the wrists in about 100 of these children, and the bone development was always within normal limits.

DR. MITCHELL.—The question was asked, "Do children tolerate thyroid therapy better than adults, and can thyroid extract be administered to obese children whose basal metabolic rate is above zero?"

DR. JOHNSTON.—This tolerance of children is no different from that of adults, although some workers think they are somewhat more sensitive to it. I would like to point out that there is a tendency to overdose with thyroid. We studied two cretins for a year. We had one balance that ran for fifteen months, and we found that the retention of nitrogen and calcium was a beautifully sensitive indicator of the amount of thyroid we needed. If we gave the cretin half a grain more than he needed to bring his rate to normal, the anabolic effect that we induced, the increased storage, the increased retention, was promptly changed to increased excretion. The role of the thyroid in calcium metabolism is very interesting. With a very low rate, there is a negative calcium balance, that is, in the growing period; it's not true after growth is finished, but in the growth period a rate of −20 is accompanied by a negative calcium balance of as much sometimes as −250 mg. a day. That figure was in a cretin. As you bring the rate up to normal, that is changed. It is changed as a result of the diminution in the fecal excretion.

If, then, you increase the dosage of thyroid, the urinary excretion increases and negative balance again occurs. The zone of a positive balance, without which growth is impossible, is a rather narrow one, ±10, we'll say; but if it gets too high, as much harm can be done as by allowing it to remain below. And it doesn't take much thyroid extract to push the balance too high.

DR. MITCHELL.—I think the panel decided that fundamentally we ought to consider that adolescence is a period through which we all go, and somehow most of us get out of it in such a way that we can become adjusted to the community and to other people. In other words, and to be brief, we eventually become ethical; we learn to act properly toward the rest of the community, but at the same time we retain our own individuality in that community. There are, however, certain conflicts which arise which seem to be somehow inherent in the period of adolescence, and these are complicated and made worse if environment is not correct. By environment we mean the family, the siblings, the playground, the church, and all of the various contacts in the community.

Furthermore, we must recognize that the adolescent searches for independence, but during the period of searching he needs a good deal of help and he can't afford to ask for it too openly. Skillful environment, the parents primarily, will see that the adolescent is managed so that he will seek advice when it is needed. Advice should not be given too freely or didactically, and not constantly.

The problem of sex is a fundamental part of the business of adolescence. There seems to be some difference of opinion as to when the interest in this function begins, but that difference was apparently ironed out in the discussion. Certainly we decided that the problem becomes more acute in adolescence whether or not it was present before, and that it continues for awhile after adolescence, although how long the interest lasted wasn't admitted by all members of the panel.

We decided that the economic problem was a serious one, and it probably affects the adolescent greatly. The young child is not aware of it so acutely. He gets much of what he wants and assumes it as a right. If he doesn't get it, it's too bad. But the adolescent begins to compare his lot with other adolescents, and it becomes a much more prominent problem, entering into such factors as the type of school, the type of clothes, and the possibility of marriage.

We discussed environment a good deal, but we remember that there is such a thing as hereditary background, that different adolescents do have different capabilities, and that there are wide limits to what can be considered to be normal and to allow functioning in a community. Normality is not a line or a series of spots on a chart. We must be careful to see that the child is not pushed either physically or intellectually beyond his individual capability; somehow his individual abilities should be determined. One of the great difficulties is in educational procedures which attempt standardization, trying to make all children in the class absorb the same information in the same length of time, when obviously some can perform better than others. This problem also becomes more acute in adolescence. We should remember that the fellow who is above the average needs some help and guidance as well as the fellow who is below the average.

An important point was emphasized when it was stated that early training and what happened before adolescence became significant at the time of adolescence. The proper background and associations and liaison between child and parents should have been established early in life.

In discussing growth, we also came back to the fact that here again individuality exists. Some children are going to be tall; some are going to be short; some are going to be more or less round; and some are going to be narrow. These characteristics are fundamental and cannot be changed; in fact, we must not attempt to change them. We should not interfere too much with what the individual is supposed to be physically. We should recognize the broad bands which con-

stitute normality in the time of onset of puberty. It requires individual study to determine whether a child is normal; he cannot be judged by his correspondence to a so-called normal chart. Dr. Johnston brought out that we have certain aids that might help us to determine in a specific case whether early or late menstruation, for example, is normal for the individual girl. We must be extremely careful in the administration of endocrine preparations; some may do harm. It was brought out that some of these endocrine preparations might have a bad effect by leading to undesirable subsequent changes.

We were impressed with the fact that at puberty there were certain metabolic changes which were related to physical growth. We must be alert to determine exaggerations of these; but, by and large, these changes usually belong in the category of averages and they happened to most children. We should be careful not to stigmatize abnormalities such as obesity as syndromes. We still know little concerning obesity, and, when we decide that the child is obese and belongs out of the average, it is difficult for us to know exactly what to do about it. We realize that many such children will adjust themselves to normality and that others show obesity only as part of some other type of disturbance; for these other disturbances we can often do nothing. Thus we come back to where we started and realize that the adolescent is influenced by many factors—physical and mental, hereditary and environmental. To state it simply, he consists of body and soul.

We also arrive at the conclusion that, as pediatricians, we have a function to carry out in the physical and mental care of the adolescent, a function which we can fulfill, in many respects, as well as anyone else. We had better carry on this particular job, asking for assistance when we get into difficulties which are too complex for us to solve. We need the help, for example, of the psychologist and psychiatrist. Certainly, however, we need not refuse to assist with the problems of children who are over the age of 12 years. The adolescent belongs to us; we know his background, and we have given more attention and study to certain phases of adolescence than the internist. We must continue to study the problems of adolescence, many of which are today unsolved.

NINTH ANNUAL MEETING OF THE AMERICAN ACADEMY OF PEDIATRICS

CINCINNATI, OHIO—NOVEMBER 16-18, 1939

Round Table Discussion on the Prevention of Contagious Diseases

Chairman: J. A. Toomey, M.D., Cleveland, Ohio
Assistants: E. B. Shaw, M.D., San Francisco, Calif.
G. W. Kutscher, Jr., M.D., Asheville, N. C.
C. F. McKhann, M.D., Boston, Mass.
J. S. Baird, M.D., Pittsburgh, Pa.
H. T. Price, M.D., Pittsburgh, Pa.
Secretaries: Ralph E. Pray, M.D., Fargo, N. D.
A. S. Traisman, M.D., Chicago, Ill.

Convalescent Mumps Serum

G. W. Kutscher, Jr., M.D., Asheville, N. C.

Although there is nothing new concerning the etiology, diagnosis, and treatment of parotitis in the past fifteen years, some progress has been made in the prophylaxis against the disease. The latter is illustrated by an experience in a boys' camp this last summer.

One hundred and twenty-five boys attended this camp, and fifty-two of them had never had mumps. Thirteen days after the camp opened, mumps was discovered in a boy who had suffered a neck injury. The orthopedic surgeon had applied a restraining bandage which included the lower jaw as well as the neck. Fever developed which could not be explained on the basis of injury. The dressings were removed, and bilateral parotitis was discovered. This boy had been visited in the infirmary by every fellow camper susceptible to mumps; hence, all were exposed. The problem then presented itself: What should be done for the remaining fifty-one susceptible boys, some of whom were 300 miles from home?

Three of the camp directors who had had mumps in recent years (one had recovered only one month previously) offered their blood. Fifteen hundred cubic centimeters were collected, and from this 500 c.c. of convalescent serum was obtained. The serum was found sterile and Wassermann negative, and the samples were pooled. On the fourth day after the first case of mumps was discovered, the convalescent serum was administered.

The ages of these boys were between 9 and 16 years. To those younger and of lighter weight 8 c.c. of the serum were administered intragluteally; to the older and heavier boys, 10 c.c. Those with a history of allergy were given skin tests, without showing any reaction.

There were no delayed serum reactions or marked local tenderness at the site of the injections. There was no increase in temperature, save in one instance, when fourteen days after exposure and ten days after receiving a dose of the serum, another case of mumps developed. Although there was failure to protect here, there was also a history of a possible outside exposure. This boy developed a very mild attack of the disease.

The late Alfred Hess, in 1915, was the first to report upon the prophylactic use of convalescent whole blood in parotitis. The seventeen children in his series

were 100 per cent protected by the use of from 6 to 8 c.c. of blood. Reagan, in 1925, was the first to report on the use of convalescent serum prophylactically in doses of from 2 to 4 c.c., with practically 100 per cent success. Reagan advises the use of the serum before the seventh day following exposure. The literature contains several additional references to the use of convalescent serum against mumps.

Possibly the dose of from 8 to 10 c.c. of serum given in this study was larger than necessary. Half of the dose might have been adequate. However, since only one of the donors was a recent convalescent, it was thought wise to use the larger dose, especially since it was available.

With a recognized infection incidence of between 20 and 50 per cent following intimate exposure, it is believed that this procedure protected between fifteen and twenty-five boys against the disease. The one failure to protect allows a protection incidence in this study of 98.04 per cent. In other words, fifty out of fifty-one susceptible and exposed boys were protected against mumps. Since it is well known that convalescent measles serum will often prolong the incubation period following exposure to measles, this fact was kept in mind in this study. Because of the fact that no additional cases developed in the remaining five weeks of camp following the administration of the serum, it is believed that doses of from 8 to 10 c.c. of convalescent serum will adequately protect boys of this age against the disease. Such a course allowed us to keep the camp open for the season.

DISCUSSION

DR. J. W. BRUCE, LOUISVILLE.—In the differential diagnosis of mumps, milking along Stensen's duct produced a purulent secretion in nonepidemic parotitis.

DR. M. ZELIGS, CINCINNATI.—In a boarding school where there were eighty-five boys, two cases of mumps developed. Fifty boys gave histories of never having had mumps. From 5 to 10 c.c. of convalescent serum were given to every one of the eighty-five boys, and there were no other cases of mumps in the institution.

CHAIRMAN TOOMEY.—In an orphanage numbering 410 children, two cases of mumps developed. Although prophylaxis and passive immunity were not employed, no other cases developed.

DR. S. KARELITZ, NEW YORK.—Ten cubic centimeters of serum were administered to fourteen youngsters under 5 years of age who had developed mumps. Of the fourteen, five were not modified by the serum. Only local reactions were obtained. From these facts I am unable to draw any definite conclusions.

DR. SHAW.—It seems plausible that as the age of the child increases more serum should be given.

DR. A. F. ABT, CHICAGO.—The main thing is to increase the dose with increase in weight.

DR. H. TREMAINE, BOISE.—From observations it seems that the younger the patients, the better the results.

DR. G. L. DRENNAN, JACKSONVILLE, ILL.—Mumps is a fairly common cause of deafness. In a study of 10,000 deaf children above 2 years of age, from 2 to 3 per cent of acquired deafness followed mumps.

DR. SHAW.—It is probably similar to that which follows meningitis and probably is due to damage in the cochlea and is secondary to the very common meningeal involvement.

DR. A. S. TRAISMAN, CHICAGO.—What is the frequency of recurrent epidemic parotitis?

DR. KUTSCHER.—I do not have exact figures, but it is rare.

DR. J. V. GREENEBAUM, CINCINNATI.—Have you ever seen purpura in mumps?

CHAIRMAN TOOMEY.—No.

DR. T. P. SALTIEL, CHICAGO.—What is the procedure to follow when a susceptible father and mother have been exposed to a child with mumps?

DR. KUTSCHER.—The supposition, of course, is that the father and mother have not had mumps. If they have not had mumps, the same procedure should be followed as in the case of children.

Poliomyelitis

Joseph S. Baird, M.D., Pittsburgh, Pa.

We had two or three cases of poliomyelitis late in July. New cases are still giving trouble even now in November. There were, in all, about forty cases in the city, and twenty-three cases from outside the city came in for care. All were children. The twenty-three cases occurred along the river, and at no time were there two children in one family who were stricken with the disease at the same time. No contacts were indicated between cases. Nine deaths, all bulbar types, were reported.

Dr. Henry T. Price at Children's Hospital in Pittsburgh had ten patients on whom he used the respirator. Four made good recovery. The average number of respiratory days was 280. During the past month, he reported five cases even though there has been frost.

Recently there has been no work on the prevention of poliomyelitis that has been of any value. From work done at Detroit it may be concluded that convalescent serum does no good. The Public Health men in Michigan have verified this opinion. They report that nasal spray used as prevention has actually done damage and been of no benefit.

Dr. Albert Sabin, Cincinnati, Ohio

The shortest comment on the present status of prophylaxis and specific therapy of poliomyelitis would be that there isn't any. When we inquire why there isn't any, we find that as regards prophylaxis experimental studies both in monkeys and man established that available vaccines were either ineffective or dangerous, or both, that little or no protection can be expected from immune, convalescent, or adult sera, and that, while certain nasal chemical sprays can protect monkeys against infection by the olfactory route, similar sprays in human beings have yielded no evidence of protection against the natural disease. Although it has been glibly stated in recent years that the virus invades the human nervous system by the olfactory pathway, there is no evidence derived from studies on human beings that such is actually the case. My own studies on more than 2,000 serial sections of olfactory bulbs from ten cases of human poliomyelitis failed to reveal the lesions which I have always been able to find in monkeys whose nervous systems were infected via the olfactory route. I mention this not as conclusive evidence against the olfactory portal of virus entry in man, but rather to indicate that there is as yet no good evidence for it. All this is brought up here because any hope that may possibly be entertained for the prophylactic effects of the spraying or instillation of certain chemical substances into the nose is dependent upon the virus invading the human nervous system by the olfactory route.

Specific immune serum therapy after signs and symptoms of the disease, either preparalytic or paralytic, are apparent has neither theoretical nor practical basis at the present time. Theoretically, there is every reason to believe that most of the cells that are going to be affected by the virus are invaded several days before the appearance of clinical signs and that not even large amounts of antibody can influence the effects of the intracellular virus or prevent it from spreading to other cells. The best evidence for this as regards poliomyelitis is found in monkeys which develop significant amounts of neutralizing antibody as a result of vaccination and yet are fully susceptible to nasal instillation of the virus. Practically, as is well known by now, the results of properly controlled studies in man showed no effect of convalescent serum either in the preparalytic or paralytic stages. The suggestion that injections of vitamin C can prevent the development of paralysis in monkeys has not been confirmed in carefully controlled experiments in which it was found that neither large nor small amounts of the natural or synthetic vitamin modified the course of the experimental disease in any way.

DISCUSSION

CHAIRMAN TOOMEY.—Does serum do any good? Levinson of Chicago thinks that not enough serum is used.

DR. McKHANN.—Monkeys and human beings are not the same. Therefore, the work done on monkeys does not show what can be done on human beings. In Boston, the virus has been injected intraspinally (intracerebrally) and convalescent serum (150 c.c.) has been given with no benefit.

CHAIRMAN TOOMEY.—If one introduces poliomyelitis virus in the experimental animal by way of the gastrointestinal tract and then gives serum, poliomyelitis does not result.

DR. SHAW.—Serum does some good. The real argument is, Can any amount of serum given do any good? Should it be poured in, with no set amounts given? No one has ever standardized the amounts to be administered. Remember that much of the serum may have no potency, may not be hyperimmune serum. It has been my experience that patients who are given serum do better than those who receive none. Experiments on human beings cannot, of course, compare with those on monkeys. Poliomyelitis may not be just a disease of the central nervous system. There is a systemic phase. If there is, we should certainly use serum.

DR. McKHANN.—I believe that serum might influence the preparalytic, but I have no adequate background for this statement.

DR. I. A. ABT, CHICAGO.—Belief in a therapeutic procedure dies hard. Why not face the facts? We have no prophylactic nor curative treatments. We know nothing about it.

DR. E. G. HORTON, COLUMBUS.—The Lord is merciful in our cases of poliomyelitis. I have lost faith in my ability to do anything about it. Even severe cases have come through this year.

DR. H. B. SILVER, NEWARK, N. J.—Dr. Kramer of Brooklyn says that nasal washings with ephedrine do some good. This treatment may be used some day.

Diphtheria

H. T. Price, M.D., Pittsburgh, Pa.

What stage is diphtheria in and what is it? Will it be relegated to a heap of unknowns? That is always a possibility, though a rare one. The first thing to

do is to stamp out the focus. The lack of cooperation of the medical profession in protecting children may result in a severe epidemic. First toxin-antitoxin was used, and now toxoid, but the use of either is always followed by a Schick test.

Remember that streptococcic throat infections were often called laryngeal diphtheria in days gone by. We now realize more what diphtheria is. If we do diagnose it properly, serum should give results.

DISCUSSION

CHAIRMAN TOOMEY.—How much of our present decrease in morbidity is due to a natural lull rather than to prophylactic measures? We are probably in a trough of the disease.

DR. G. H. FELLMAN, MILWAUKEE.—We may have an experience similar to the one in Vienna in 1933. There the serum proved of no value.

DR. KARELITZ.—Refugee children coming into this country now frequently give a history of having had diphtheria. None have been given prophylaxis, and they have about the same number of diphtheria cases with no prophylaxis as we do with it.

DR. A. D. KAISER, ROCHESTER, N. Y.—One or two inoculations should be given before or after the Schick test.

DR. GREENEBAUM.—It is good practice to give the combined diphtheria and tetanus toxoid if the follow-up Schick test is positive.

DR. McKHANN.—Repeated Schick tests give pseudoreactions. When one is going to repeat a Schick test, there should be an interval of from two to four weeks.

DR. I. A. ABT.—I am not sure that this is a lull in diphtheria. It may be permanent. We may wake up to find ourselves in an epidemic of refractory cases. Austria did not immunize at all. Despite this, there was no diphtheria there for ten years. Then after that there was a terrific epidemic.

DR. H. B. METTEL, INDIANAPOLIS.—Whether the Schick test is negative or positive, we have only a skin reading. It does not mean that the child is protected against diphtheria.

DR. FELLMAN.—How many are using combined diphtheria and tetanus toxoid?

DR. KUTSCHER.—I would not give serum for puncture wounds if I had given tetanus-diphtheria combinations before.

DR. HORTON.—Some practicing physicians do not know diphtheria. I should protest against the single shot immunizations.

DR. I. A. ABT.—In tetanus, make every puncture wound an open wound, clean it out, and incise it. Then you won't need passive immunity and you can avoid the use of so much serum.

DR. ZELIGS.—Do you feel that two hypodermics of alum-precipitated toxoid would raise the titer if used at two-month intervals instead of three-week intervals?

DR. PRICE.—The method is to use the second dose of toxoid in three weeks. Then do a Schick test. If positive, repeat the toxoid.

DR. SHAW.—The capacity of the patient to produce antitoxin from shots is the all-determining factor.

DR. M. L. COOPER, CINCINNATI.—Merely the administration of a Schick test gives elevated titer in the blood.

DR. McKHANN.—In my experience several patients with negative Schick tests have developed diphtheria. However, the Schick test indicates some resistance to diphtheria.

DR. BAIRD.—A recent Public Health convention summary stated that two doses of alum toxoid given from three to four weeks apart are more effective than three doses of toxoid plain.

DR. G. F. PATTERSON, CINCINNATI.—Of 123 children, one-fourth were immunized with toxin-antitoxin. The others were immunized with toxoid. For ten years the children had Schick tests each year. The entire group has remained negative until this year when there were seven positives.

DR. F. B. MINER, FLINT, MICH.—Skin sensitivity sometimes gives a false positive Schick test. Give two doses of alum toxoid, one at 9 months of age and the second dose at 10 months. Repeat the Schick test on entering school.

DR. DRENNAN.—What dose of precipitated toxoid is used?

CHAIRMAN TOOMEY.—This dose has been variable. The doses recommended by the Committee on Immunization and Therapeutic Procedures for Acute Infectious Diseases of the American Academy of Pediatrics are as follows: "Three types of material are used to immunize against diphtheria: (1) diphtheria toxoid and (2) alum-precipitated toxoid for children under 10 years of age, each toxoid material to be injected in doses of 0.5 c.c., 1 c.c., and 1 c.c. at two- to four-week intervals. Variations of these doses of the toxoids have been used if reactions follow the initial injection. One-tenth cubic centimeter, 0.2 c.c. and 0.5 c.c. are given every two to four weeks, and an additional dose of 1.0 c.c. may be given if the reactions are not too severe. (3) A horse and goat toxin-antitoxin for persons over 10 years of age injected subcutaneously in doses of 0.5 c.c. and 1 c.c. at two- to four-week intervals."

DR. R. P. ROGERS, GREENWICH, CONN.—What is the relative reaction following a Schick test and that after a dose of toxoid in a child negative to the Schick test?

CHAIRMAN TOOMEY.—There have been no reactions in children negative to the Schick test, but there will always be some reaction, although often slight, to an injection of toxoid.

DR. I. R. COHN, TOLEDO.—Is precipitated toxoid preferred over fluid toxoid? How about the value of diphtheria-tetanus toxoid?

CHAIRMAN TOOMEY.—I believe that precipitated toxoid mixture will become the material of choice.

DR. I. P. BRONSTEIN, CHICAGO.—For how long a period will tetanus toxoid protect?

DR. SHAW.—This has not been determined as yet. In cases of tetanus, antitoxin gives a protection for only a short and variable period of time. Medicolegal considerations lead to the use of many doses of tetanus antitoxin, but it is hard to prove how much immunity of any value is actually thus provided. A good many cases of tetanus have been given tetanus antitoxin as a prophylactic. It seems reasonably assured that the patient who has been given tetanus toxoid, and then following injury has been given a second dose of toxoid, has a better prospect of being completely protected against tetanus than one who is given only tetanus antitoxin.

DR. M. F. OSTERLIN, TRAVERSE CITY, MICH.—How many shots of toxoid should be given to obtain a negative Schick test? I had a patient to whom I gave the injections without obtaining a negative Schick test.

CHAIRMAN TOOMEY.—Very frequently those persons who seem problems in immunization are really nothing more than patients who have become sensitive to the products contained in the broth in which the bacteria grew, and it will be found that the majority of these patients who still show reaction after immunization are sensitive to these products.

Prevention of Measles

Charles F. McKhann, M.D., Boston, Mass.

Deaths from measles are usually to complications of the disease, especially pulmonary disorders caused by the streptococcus or pneumococcus. Many of these complications might be prevented by adequate isolation of measles patients. Patients with measles should not be placed together on group isolation, but should be on individual precautions in separate rooms, if possible. Thus, patients with measles will not carry the disease to one another, but they may by coughing or sneezing disseminate, either by direct contact or by air-borne infections, secondary organisms to their bed neighbors. Since deaths are more numerous at the younger ages, precautions should be especially stringent in these groups. Masks of proper filtering design will help to prevent the spread of dangerous organisms from the personnel to the patient. Investigations as to the role of air-borne infection in the spread of measles and its complications have been carried on in the past three years. Definite statements as to the relative proportion of direct personnel-to-patient infection and of air-borne infection in the dissemination of measles and complicating organisms, as well as an appraisal of the value of ultraviolet light in prevention of transmission, cannot as yet be made.

Sulfanilamide and sulfapyridine have been observed not to have any effect on the course of measles, but may be effective in the treatment of streptococcal or pneumococcal complications. Some authors have recommended the use of these drugs throughout the course of the febrile eruptive stage as a preventive of serious complications. Should such a procedure be proved relatively free from danger and effective, its wide adoption would further minimize the dangers of the disease and render the search for biologic preventives less important.

Specific treatment of measles is not as yet possible after the appearance of the eruption. Large doses of serum may be effective in mitigating the severity of the attack, if given before the rash appears. An active immunization is urgently needed and is promised by the work of Wenckebach and others who claim to have cultivated the virus in chick embryos and to have observed that after cultivation the virus becomes attenuated and an injection into susceptible persons produces a modified disease. When measles virus, either attenuated or of normal strength, becomes available, inoculation of patients with subsequent partial immunization of patients who have received full strength virus will be justified.

Prevention or modification of the disease by the use of human immune bodies in the form of convalescent serum, adult immune serum, or immune globulin (placental extract) remains the only reasonably dependable prophylactic procedure. Yet with the diminution in complications following better isolation of measles patients and with successful therapy available for some of the more severe complications, even the prevention or modification of measles by the use of serum need be used only in selected instances.

Convalescent serum and human immune globulin (placental extract) seem to be somewhat more effective than adult immune serum, while convalescent serum

has the advantage over immune globulin of being more uniform in its potency and it seldom causes a local reaction at the point of injection. The dosage of any of these agents is determined, in addition to potency, by the time of administration, age and sex of the patient, and possibly by the degree of exposure. Convalescent serum is usually effective in from 4- to 6-c.c. dosage; immune globulin from 2 to 4 c.c.; and adult immune serum, from 15 to 20 c.c. Immunity resulting from the administration of these substances is passive in character and of short duration, seldom lasting more than two or three weeks. The time of administration is a factor of great importance in determining whether prevention or modification of the disease will be induced. Early in the incubation period, the injection in the doses given above will usually prevent the disease, while later in the incubation period larger amounts are needed; and after the onset of symptoms, still larger amounts are required if any effect is to be achieved. In measles modified by the use of serum, the incubation period is often prolonged, necessitating the lengthening of the quarantine period of children who receive the serum. Severity of the disease is reduced oftentimes so much that the typical features of the disorder are not observed. Complications are usually avoided. Whether the extreme modification which is sometimes obtained results in active permanent immunity has not been definitely determined. However, in general, the attenuated disease is thought to give permanent immunity and is, therefore, the desirable result of serum administrations. In certain types of patients, notably institutional cases, or acutely or chronically ill debilitated children, especially those between 6 months and 2 years of age, during which time the death rate in measles is high, protection through the use of serum should be obtained if possible.

DISCUSSION

DR. I. B. SILBER, CLEVELAND.—Reaction from immune globulin has seemed to aggravate some cases.

DR. KARELITZ.—The extraction of globulin from human blood seems a good prospect. Then standardized doses would be possible. Blood from the cord, third labor stage, and laked blood could provide the source. No two workers in measles are able to compare their results as far as doses, effect, etc., are concerned. I believe that schools are not good controls.

DR. COHN.—Should sulfanilamide be given as treatment of measles?

DR. McKHANN.—I feel that sulfanilamide should be given to those persons who have complications of this disease.

DR. GREENEBAUM.—Is there any value in the use of immune globulin by mouth?

DR. McKHANN.—I do not believe so.

DR. KUTSCHER.—What is the duration of immunity following serum to modify measles?

DR. McKHANN.—This is merely a passive immune principle and such immunity may be lost within a few weeks.

DR. COHN.—Is natural immunity present in some children?

DR. McKHANN.—There is a possibility that some children may be immune, but the number is so few that, for practical purposes, it may be ignored.

Scarlet Fever

John A. Toomey, M.D., Cleveland, Ohio

There have been many complaints about the reactions which follow injections of scarlet fever toxin during the process of active immunization. That reactions occur is obvious since many procedures have been recommended to avoid them. The Dicks now grow their organisms in broth-free media, and after Jan. 1, 1940, all immunizing toxins will be of this type.

Price and his associates at Children's Hospital in Pittsburgh are attempting to concentrate and purify these toxins. They claim good results with their product. It may be stated in passing that the United States Public Health Service is interested in a toxoid. However, the only thing a practicing physician can now obtain is the standardized toxin of the Scarlet Fever Commission.

There is no doubt in my mind that we can immunize persons who have positive skin tests to the point where their tests become negative and that this immunization procedure is of practical value. In the past, 25 per cent of the nurses who came on our wards and who were exposed to scarlet fever contracted the disease. Since 1926 we have immunized nearly 2,000 nurses who had positive tests and have had only eight failures of immunization. Some believe that such persons are rendered negative to skin tests, but are made more susceptible to local infections. This has not been our experience. Nurses with upper respiratory infections—throat, etc.—at the City Hospital have been directly admitted to the Contagious Hospital for the past three years, and there has been no marked increase in the number of upper respiratory infections. The economic benefits received by the hospital and the patient more than compensate for the reactions suffered.

Many of the nurses had both local and general reactions, fairly severe at times with arthritis, adenitis, etc., and immunization had to be stopped in twenty-five instances. Over 99 per cent of these persons who had a negative Dick test after they had been actively immunized did not contract scarlet fever. On the other hand, many persons with negative Dick tests who have not been immunized have contracted the disease. In short, a negative Dick test is not as indicative as a positive one in an unimmunized individual, but it is still a practical test.

Scarlet fever antitoxins were so bulky and caused so many reactions (6,000 units in 20 c.c. of horse serum) that we discontinued their use for several years.

A few years ago it was discovered that scarlet fever antitoxin could be concentrated and that most of the factors causing the reactions we objected to could be digested out by enzymes and the remaining albumin dialyzed, precipitated, and filtered away. The Lederle Laboratories concentrated their material down to approximately 3 c.c. We tried this antitoxin in over 800 cases (Lederle), injecting it intramuscularly, and we were astonished at the results obtained after its use. The temperature usually dropped to normal within twelve hours after injection; there was a decrease in the number of complications; the patients felt subjectively better within the same period of time, and the rash often disappeared within twenty-four hours or was greatly modified. The number of serum reactions was not more than from 8 to 11 per cent, the approximate reaction rate we obtained in patients who had been given concentrated diphtheria sera of high potency.

Parke, Davis & Co. also concentrated their antitoxin to approximately 3 c.c. We also used this antitoxin in 800 cases and can state that the results were equally as good as those with the Lederle material. We now have at least two antitoxins (Lederle and Parke, Davis) which we feel are much better than convalescent serum. The latter is expensive and not always easy to obtain. Further-

more, it must be pooled material, and it cannot be standardized. The dose of convalescent serum in various localities ranges from 25 to 75 cents for 1 c.c. A therapeutic dose of 50 c.c. would cost from $12.50 to $37.50. A therapeutic dose of commercial scarlet fever antitoxin costs from $8.89 to $10.00. Commercial antitoxins can be standardized at a certain strength, and this standardization can be repeated easily; hence their use seems most practicable.

DISCUSSION

DR. KARELITZ.—Would horse antibody serum administered intravenously give the same results as 50 c.c. of human convalescent serum? In other words, would it drop the temperature in eighteen hours? Since the rash and fever of scarlet fever may disappear in from twelve to eighteen hours after from 50 to 60 c.c. of convalescent serum is injected intravenously, the usual titer of this serum is about 5 units per cubic centimeter. Can you obtain equally good results with such small amounts of horse serum antitoxin? I get larger areas of blanching with from 1 to 2 units of human scarlet fever antibody than with 5 units of horse serum antitoxin. This may be explained by the greater diffusibility of the human serum.

DR. DRENNAN.—How does the new scarlet fever antitoxin compare with human convalescent serum?

CHAIRMAN TOOMEY.—We feel it is much more efficient. Temperature comes down very rapidly. It is less expensive; it is a product that is easily standardized and easily kept, and the physician can secure it any time he wishes.

DR. TRAISMAN.—Have you had any experience with intradermal immunization? Is it preferred over the regular method?

CHAIRMAN TOOMEY.—Dr. Earl introduced the intradermal method. It has been a theory that the skin is a better organ of immunization than other tissues, but this point has not been ascertained definitely. There is no clinical evidence along this line.

DR. COHN.—Do immunized nurses have more sore throats than usual?

CHAIRMAN TOOMEY.—No. All persons in the Nurses' Training School, Cleveland City Hospital, with upper respiratory infections are admitted to the Contagious Hospital. We have had no relative increase in the number of patients admitted with sore throats.

The Prevention of Pertussis by the Use of Bacterial Vaccines

Edward B. Shaw, M.D., San Francisco, Calif.

The control of pertussis has always presented an urgent and difficult problem for the physician. The success of immunologic methods for the control of some other infections has, until the last few years, simply emphasized the inutility of similar methods in whooping cough. Sauer, in reviving and improving the use of bacterial vaccine for the prevention of this disease, presented a measure whose value and limitations engage the interest of every pediatrician.

It would be very time-consuming to outline the complete history of this development. Vaccines prepared from the Bordet-Gengou bacillus have long been used for attempted immunization. One should especially credit the fundamental work of Madsen[1] and Huenekens,[2] but this use was previously restricted mostly to the interval between exposure and the onset of cough. Sauer's especial contribution was the development of a standard method embracing the use of freshly isolated

strains of especial antigenic properties, grown in such a manner as to preserve their antigenicity; the employment of tremendously large dosage; and performance of immunization prior to exposure.

Since the introduction of these methods, numerous studies have been made to determine their precise value. Significant observations are based on methods which substantially follow those of Sauer. It has been stated that the complement fixation response[3] is significant evidence of immunity but even if this is unquestioned, it does not provide a method for testing immunity as simple and effective as the Schick test. The only feasible method by which the effectiveness of immunity can be estimated is the comparison of disease incidence in vaccinated groups and similarly constituted control groups. It is almost impossible to constitute experimental groups of children so as to control adequately all of the potential variables in such a study. The capacity for immunization varies with respect to constitution, age, race, other infections, etc. Constant antigenicity of the vaccine has been fairly well assured, but the pertussis bacillus is a notably poor antigen. Degree of exposure influences the likelihood of attack and is affected by such factors as duration and location of contact, the amount and intensity of coughing, and the stage of the disease of the patient.

The complexities of this problem make it impossible to arrive quickly at an arithmetical expression for the likelihood of producing immunity. A number of groups have been honestly studied, with the production of a wide range of conclusions. Observers agree that the injection of these vaccines is almost perfectly safe and is accompanied by very little discomfort. It is also agreed that the production of an immune response adequate to protect against ordinary exposure is a useful objective which justifies such minor discomfort, risk, and expense as is involved. The effectiveness and duration of protection are open to considerable disagreement.

It is a mistake, as Faber says,[4] to insist upon or expect a "solid" immunity. *Hemophilus pertussis* is a poor antigen, and even the immunity induced by the disease is often inadequate to protect, after a time, against intimate exposure. In order for vaccine to prove its value, it is necessary only to demonstrate that it increases the resistance against attack; when this is agreed upon, modification of method and extension of application may be expected to improve results.

It is doubtless improper to accept any single series as conclusive, but a careful perusal of all of the published reports leads almost inescapably to the conviction that the use of vaccine appreciably and beneficially affects the immune state of the individual. The figures of Sauer,[5] who has probably the largest total experience, of Kendrick and Eldering,[6] Schermerhorn,[7] Miller,[8] and Singer-Brooks[9] all persuasively support the value of vaccines. Doull and his co-workers[10] alone have presented a series with extremely adverse conclusions. They found the incidence of the disease not demonstrably affected and its severity to be questionably benefited. This result is in such contrast to other experiences as to raise the question of whether technical differences (preparation of vaccine?) contribute to the discrepancy.

An opinion need not be based entirely on comparison of vaccinated with unvaccinated patients. The experience of Sauer[11] and of several others has demonstrated poor protection in those given small doses, and augmented effect has been shown in one series using extremely large dosage.[12] One can thus compare a series using small dosage with one using large dosage. An experiment of Singer-Brooks was also very convincing; using siblings for controls, she compared the incidence of pertussis in those actually exposed who had had no vaccine, who had been given Sauer-type vaccine, or who had been given a bacterial extract of altogether different antigenic nature. Tremendously better results were apparent

in the vaccine group as compared with the control group or those given the other antigen, the latter patients constituting an even better control group than those to which nothing was done.

An opinion of the value of vaccines need not rest solely on the comparison of huge groups. Whooping cough is extremely contagious and a history of attack is notably reliable. Experiences in small groups multiply over and over to add to the conviction of the average pediatrician that vaccine is of value; this, at least, is my personal observation. A most convincing small-scale experiment was carried out by the MacDonalds, who used their own four children as experimental subjects. Two children, one a twin, were immunized with Sauer vaccine; the other twin and another child were not immunized. After a lapse of five months, all four children were inoculated intranasally with living pertussis bacillus. The two who were not immunized developed typical pertussis; the two who were given vaccine were resistant not only to inoculation, but to continued exposure in the household to the other two children. Even if one is not justified in drawing extensive conclusions from this experiment, it seems to me to demonstrate convincingly that vaccine is capable of producing immunity.

Even if we conclude that vaccine increases resistance, however, we cannot quickly arrive at an estimate of the duration of this effect. It is safe to say that protection varies and is not prolonged. The probability is great (although certainty is lacking) that, if immunity has once been effectively stimulated, it can be enhanced dependably later on by reinjection of vaccine, perhaps by only a single dose. Faber proposes that this be done annually; this is not conducive to childhood friendships. It might be adequate to reinject vaccine only in the fact of known exposure when once a basic immunity had been produced.

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DISCUSSION

DR. SILBER.—In 980 cases in the last five years I have had only seven cases of whooping cough in those immunized, while from twenty to thirty of my cases each year are in the unimmunized group.

DR. S. I. LEBEAU, PITTSBURGH.—Are there any dangers in the use of pertussis vaccine? I think there is the possibility of severe reactions.

CHAIRMAN TOOMEY.—If whooping cough immunization were simple, the disease should be easy to control.

DR. SHAW.—When a patient has been exposed to whooping cough, I think that he should be given an extra dose as this raises the titer.

DR. I. A. ABT.—"No man living can write the history of his contemporaries." Nobody present can estimate the efficacy of many of these preventive measures.

DR. SHAW.—Vaccine (Sauer) should be given early. The younger the patients are, the poorer the immune response. The maximum risk is under 1 year of age. Using vaccine by Krueger, I have had no success at all either prophylactically or in treatment. I know nothing about topagen vaccine.

DR. FAIRFAX HALL, NEW ROCHELLE, N. Y.—I use topagen instead of injections in treatment.

DR. G. N. HOEFFEL, BOSTON.—There is no evidence except emotion to say that Sauer vaccine has done any good.

DR. H. A. BECK, DETROIT.—On a WPA project in Michigan where the nurses did a careful checkup with the help of the physicians on district cases, the results obtained with vaccine were very satisfactory. The diagnoses were confirmed by doctors, and Dr. Kendrick was in immediate charge of the project.

DR. SHAW.—It is possible that there may be some danger in group whooping cough vaccine, but this is not likely. A single series by Bradford showed considerable value from convalescent serum. Sauer's vaccine should still be used even though proof of its true value is lacking.

DR. OSTERLIN.—What is the status in treatment of whooping cough by undenatured bacterial antigen?

DR. SHAW.—Undenatured bacterial antigen has not been proved to be of any value.

DR. J. S. HUNT, CHARLOTTE, N. C.—What is the value of large doses of vitamin C in the treatment of whooping cough?

CHAIRMAN TOOMEY.—There has been no definite evidence along this line.

DR. HALL.—What order of immunization do you advocate?

CHAIRMAN TOOMEY.—This is contained in the Report of the Committee on Immunization and Therapeutic Procedures for Acute Infectious Diseases which may be obtained from the American Academy of Pediatrics:

"1. Vaccine against smallpox at any age during an epidemic but routinely any time between 3 and 12 months.

"2. Immunize against diphtheria between 9 and 18 months. Tetanus toxoid may be used in combination with diphtheria toxoid.

"3. Vaccinate against pertussis between 6 and 9 months.

"4. Do a Schick test between 18 and 24 months. Reimmunize against diphtheria if necessary.

"5. Repeat the Schick test and smallpox vaccination at 6 years or during epidemic periods. Reimmunize against diphtheria and revaccinate if necessary.

"6. If tetanus toxoid is desired, it may be given at any age period, but the reactions are not so severe if given between 2 and 6 years. If combined with diphtheria toxoid, it may be given at the same time. Scarlet fever toxin might be given in epidemics and to groups previously indicated. Typhoid fever vaccine may be given when and where indicated."

ANNUAL MEETING, REGION IV OF THE AMERICAN ACADEMY OF PEDIATRICS

The annual meeting of Region IV of the American Academy of Pediatrics was held on May 30, 31, and June 1, 1940, at the Olympic Hotel, Seattle, Wash. The meeting was attended by 80 members of the Academy, 111 guests, and 34 exhibitors. The first day, Memorial Day, two events occupied the members and their wives—an all-day fishing derby for the men and a boat trip to Victoria, B. C., for the women. The scientific program opened on Friday, May 31, with panel discussions on the treatment of diarrhea, vomiting, and cough. Dr. Clifford Sweet, of Oakland, Calif., presided. He was assisted by Dr. Joseph B. Bilderback, Portland, Ore.; Dr. E. J. Barnett, Spokane, Wash.; Dr. Franklin P. Gengenbach, Denver, Colo.; Dr. Howard Spohn, Vancouver, B. C.; and Dr. Fred L. Glascock, Los Angeles, Calif. The reading of clinical papers of general pediatric interest occupied the rest of the day. In the evening the members, their wives, and guests were entertained at a dinner dance with a floor show, which was held in the Olympic Bowl. The program for the second day opened with a panel discussion on chemotherapy, at which Dr. Edward B. Shaw, San Francisco, Calif., presided. Assisting him were Dr. Edwin E. Osgood, Portland, Ore.; Dr. Henry F. Helmholz, Mayo Clinic, Rochester, Minn.; Dr. Harold K. Faber, Stanford University, San Francisco, Calif.; and Dr. Edward LeCocq, Seattle, Wash. Brief case reports describing unusual and interesting pediatric problems were presented during the afternoon session. The meeting concluded with a cruise on Puget Sound, with a buffet supper served on board.

Academy News

Refugee Children

In the early part of July a number of matters developed which led to the appointment of an Academy Committee on National Defense and Relief to which questions relating to the present national situation might be referred. During the first week of August, an emergency matter in regard to refugee children developed, with which many members of the Academy are in part acquainted, as their aid was asked by telephone or letter. Although much is tentative, it is thought advisable to present this matter in some detail so that the entire membership will be familiar with the background and actions up to August 16. By the time the JOURNAL reaches its readers, many new developments may have taken place.

A movement to bring children from Great Britain and place them in American homes started with the defeat of France. Many persons arranged to care for the children of relatives and friends, and a number of special groups for bringing over children and providing homes for them in the United States were organized. At once, troublesome problems of admission have arisen with legal questions of visas, quota visas, and financial responsibility. One of these committees is the United States Committee for the Care of European Children, 215 Fourth Avenue, New York, N. Y., with Mr. Marshall Field, President, and Mr. Eric Biddle, Executive Director. Nearly all groups are today merged with, or working through, this Committee, which is the one recognized by both the British and American governments.

In order to make it possible to send over children, the Commission of Immigration and the Attorney General of the United States issued an order modifying immigration regulations so that a nonprofit organization, such as this Committee, after certain formalities, could obtain authority to act. The order essentially lengthened the period of visas, permitted a nonprofit organization to pay for transportation and to guarantee that children brought over would not become public charges. It further required that children brought over must be cared for and placed according to regulations and conditions prescribed by the Children's Bureau of the Department of Labor. Such authority was granted to this Committee by the Attorney General and the Children's Bureau on July 20. Not only will this Committee aid in bringing over "designated" children for placement in the homes of relatives or friends, but also, in cooperation with a British Committee, is working to bring over "undesignated" children of whom 27,000 were listed as of August 1, and to find homes for them in American families. It was first planned to transport the children in English ships but this could not be arranged because of the inability of the British navy to provide proper convoys. Some small groups, mainly "designated" children, are steadily coming in on English ships.

The last of July, a bill was introduced in Congress which would permit the sending of American vessels, so-called "mercy ships," to England to bring back children. Such vessels will be manned by an American personnel and will not carry British adults. There is a further condition that immunity be given these vessels by all belligerents. The bill has been passed by the House and Senate, and is before the President for signature.

Representatives of the Academy were asked to participate in a conference Sunday, August 4, at Washington, at which the health problems involved in bringing thousands of children to the United States in large groups without accompanying parents or relatives were discussed in detail. Dr. Richard M. Smith of Boston, President-Elect, represented the Academy. Dr. Borden Veeder, Temporary Chairman of the Academy Committee, was unable to attend but joined Dr. Smith the next day, and steps were taken to fulfill the request made of the Academy at this Conference. These are:

1. Urgent.—To obtain medical personnel to make the trips to England and return. Although the necessary legislative action had not been taken by this time, it was desired to set up organization so that ships could be sent immediately on the completion of legislation and the granting of immunity. It was decided that the medical personnel for a ship bringing approximately 2,000 children should consist of an experienced pediatrician, two junior pediatricians (as men recently completing residences), and a surgeon capable of meeting emergencies. Only such medical work as might naturally arise with such a number of children was to be treated on board.

2. Semi-Urgent.—To provide at the port of entry (New York at present) an organization to make a complete medical examination of each child before sending the child in a smaller group to some other city for placement in a home. In this way, such medical conditions as tuberculosis, diabetes, and cardiac disease are to be weeded out and proper care is to be instituted.

3. To provide medical care for "undesignated" children in each city where groups will be sent for placement. As a start, twenty cities were designated by the United States Committee, although subgroups have been organized in some 150 cities. Such local committees must carry out their placement work as subgroups of the United States Committee, and according to regulations for placement and care drawn up by the Children's Bureau.

It is quite obvious from the above that, except for ship personnel, the problems in large part must be met with locally. The functions of the Academy Committee at that time were vague and members were in the processs of being appointed. The formation of a larger committee was held up, awaiting the scope and nature of the problems presented to the Committee. Letters were sent to all state Chairmen asking their help in finding experienced pediatricians who would volunteer for a month's service on the "mercy ships." The department heads of a number of medical schools in the East were asked to find younger men who have recently completed their residencies to serve as junior officers. One experienced surgeon was found by the second day for the first ship, and lines were placed to find others.

The greatest task was regarded as the medical examination of the children at the port of entry, as a large number of pediatricians would be needed and necessary cooperation with local clinics would have to be arranged. Dr. Rustin McIntosh was located on vacation and accepted the task of setting up this organization. Dr. Philip M. Stimson of New York, who had been notified of his appointment to the Academy Committee the previous day, approached the United States Committee in New York, the Children's Bureau, and Dr. McIntosh, and took over a telephone request from the Children's Bureau to look after a small group arriving August 12. Dr. Stimson and Dr. McIntosh arranged for a meeting of local pediatricians and clinic heads in New York on Tuesday, August 13.

To get the work started in the twenty cities designated so far by the United States Committee for placements under the subgroups, a member was selected and asked to head the medical care in that city. As acceptances were received by wire, the United States Committee was notified, which, in turn, instructed the subgroup chairman in the respective city to get in touch with the Academy

member designated to head the local medical service. In one city the plan has been started by asking the Academy members and other qualified pediatricians to care professionally for a limited number of "undesignated" children. Such children will be assigned in rotation to those volunteering. "Designated" children are not involved, and any arrangements for medical care between persons with such children in their homes and the physician is a purely personal matter. In addition, surgical, nose and throat, and eye consultants will be added to the list. Arrangements for hospitalization offer certain local problems, and these must be solved by discussion between the subgroups and medical head, and the local institutions.

At the present time, in addition to Dr. Veeder, Dr. Stimson, and Dr. Smith acting *ex officio*, Dr. Joseph S. Wall of Washington, D. C., and Dr. Lendon Snedeker of Boston have been appointed to the Academy Committee. It is quite obvious that the work of the Academy Committee is rather general, and that, from the nature of the problem, the local situations are most important and must be within general limits, and that the standards set up by the Children's Bureau must be worked out by the group in each city, which in large part must act independently according to the local situations. The Academy Committee will act as a general clearing and liaison committee in so far as the refugee children's problems are concerned. Additional members will be appointed as need arises. If it turns out that a great many "undesignated" refugee children are brought to the United States, the help of every Academy member will be needed. The Academy Committee has pledged the help and aid of every Academy member to the United States Committee and to those who have accepted local responsibility.

Any member willing to offer his services for duty on a "mercy ship" is requested to write to Dr. Veeder in St. Louis, or to Dr. Smith in Boston. Arrangements for compensation are being made.

One other problem brought before the Committee was that of the Committee's acting as an agency to find places in the homes of American physicians for children of British physicians. After consideration it was decided that this was a function for some other committee or for the American Medical Association. Should any physician desire to take into his home children of his British colleagues, he should communicate with his local committee or directly with the United States Committee, which will furnish details as to the necessary application forms, guarantees, etc. Early in August there were a number of such children in Canada for whom homes in the United States were wanted.

By the time this reaches the JOURNAL readers, either the Academy will find itself in the midst of a busy scene, or the entire matter will be held up. In the latter case, we can at least have the satisfaction of knowing that the Academy was prepared, willing, and ready for action. The response by the Academy members, whose aid in one way or another has been asked, has been overwhelming. Wires and letters have been pouring in, accepting appointments and offering aid.

Book Review

Brucellosis in Man and Animals. I. Forest Huddleson, D.V.M., M.S., Ph.D. Second Edition. New York, 1939, The Commonwealth Fund. Pp. 337. Price $3.50.

This book is a new edition of the manual of "Brucella Infections in Animals and Man," published in 1934, which has been revised to fill the need for a more comprehensive and inclusive treatment of the subject of brucellosis; the title has been modified to correspond with the contents. The revised edition presents important changes that have been made in laboratory methods of diagnosis and new facts pertaining to the nature of the disease. It also contains a detailed discussion of the clinical manifestations and epidemiology of the disease in man. Data have been taken from several articles previously printed but no longer available, and new information not heretofore published has been included.

The three co-authors have made many contributions to the brucellosis problem. Dr. A. V. Hardy was the first to make a complete survey of brucellosis in man in the United States, with special reference to the state of Iowa. Professor J. E. Debono, of Malta, has for many years devoted considerable time to the study of the *Brucella melitensis* type of the disease. The material included in his discussion is based on compiled data obtained from a study of a large number of cases occurring on the Island of Malta. Dr. Ward Giltner has interested himself for a number of years in the animal and human health problems evolving from the brucelloses.

The book should be of distinct pediatric interest since cases of brucellosis occur in young children and adolescents, and one should be informed of the many problems concerned in this disease. It is a monograph containing the most valuable information on the subject.